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Trichomonas Disease of Cattle

(*Continued from page* 224.)

Description of the Outbreak

by

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SOUTHAMPTON

A cow exhibiting symptoms which can now be described as being characteristic of this disease was first brought to my notice on July 5th, 1935, but it was not until March 15th, 1936, that diagnosis was confirmed by microscopical demonstration of the trichomonad.

There was an interval of nearly three months between the first two cases, but subsequently others occurred in rapid succession until August, 1936, the total number of animals involved being 23 in the major outbreak.

The train of symptoms varied and two distinct clinical types of the disease can be stated to exist: one being associated with inhibition of the oestrus for varying and frequently prolonged periods, the other with early abortion of the foetus and subsequent return to oestrus. In both types of the disease, however, characteristic symptoms occur common to both, which, in my experience, are clinically diagnostic of trichomonas infection of the vagina and uterus of cattle.

The first cow reported (No. 1) was served on February 5th, 1935, and had shown no return to oestrus; but on July 4th, 1935, was observed to have a discharge from the vagina somewhat similar to that associated with oestrus. Examination *per vaginam* revealed a small amount of almost clear mucilaginous discharge. The walls of the vagina were moist; the somewhat dry adhesive feeling which, in my experience, is usually associated with pregnancy being absent. The cervix was closed but no uterine seal could be palpated. There was no evidence of vaginitis. Examination *per rectum* revealed the uterus to be enlarged—its size corresponding to that of a cow four-and-a-half to five months pregnant. The uterus was, however, very much more tense than usual and neither the foetus nor the cotyledons could be palpated through the uterine wall. The ovaries were examined but no corpus luteum could be palpated.

The cow was isolated and a blood sample was taken for agglutination test for abortion. This was repeated in 14 and 28 days, all three tests proving negative. No further discharge was noticed.

The cow was examined at the end of 28 days, the clinical observations being similar to those previously made. The size of the uterus, however, appeared to be greater and to correspond with the period of gestation. The cow was kept isolated and under observation. She suddenly came into oestrus on August 29th, was examined the following day and appeared perfectly normal. There was no abnormal discharge from the vagina; the cervix was closed and on rectal examination the ovaries and uterus appeared quite normal for a cow which had been in oestrus within the previous 24 hours. A further blood test was taken for agglutination test after 14 days: the result was negative. The cow was served on September 19th; she held to service and delivered a live calf at full term.

On September 30th, 1935, a cow (No. 2) started a slight almost clear mucilaginous discharge from the vagina. She had been served on May 7th and had held to service. Examination *per vaginam* and *per rectum* revealed the same features as those noted in cow No. 1. The discharge persisted for two days and a similar discharge was noticed at intervals afterwards. Agglutination tests for abortion were negative. She came into oestrus on November 27th but was not served until January, subsequently delivering her calf at full term.

Another cow (No. 3) was served on July 9th and discharge was noticed at the beginning of October. Examination *per vaginam* revealed the same features noted in cows No. 1 and No. 2. On rectal examination the uterus was found to be very tense and approximately the size of a uterus of three months pregnancy. The tenseness was similar to that found in cows No. 1 and No. 2, and was characteristic of a *uterus in oestrus* though the size of the organ

corresponded to that of a three months pregnancy.

From my experience of these three cows I came to the conclusion that this marked tenseness of the uterus on rectal examination was typical of this condition and was apparently due to hyperplasia affecting the whole of the uterus, the greatest enlargement being in the body—the uterine cornua being equally enlarged but not elongated. My impression was that I was palpating erectile tissue. As in the other two cases, examination of the ovaries failed to reveal the presence of a corpus luteum.

On November 21st, cow No. 4, which had been served on September 19th, was found to be discharging similar almost clear mucilaginous fluid. Examination *per rectum* agreed in every detail with previous cases: the size of the body of the uterus corresponded with that of the period of gestation, both cornua being equally enlarged and tense. This cow was kept under close observation and was examined at intervals of 14 and 21 days. The uterus increased in size corresponding with advancing pregnancy and the typical clear mucilaginous discharge was occasionally noted. The cow suddenly came into oestrus on February 17th, 1936, and on examination *per vaginam* and *per rectum* appeared perfectly normal. Agglutination tests for abortion proved negative.

A similar history was noticed in the case of cow No. 5.

No. 6 showed similar symptoms. She was served on July 23rd, 1935; discharge was noticed on January 1st, 1936, and she returned to oestrus on January 21st, 1936.

A careful examination of the ovaries *per rectum* in all six cows failed to reveal the presence of a palpable corpus luteum. The parenchyma of the ovaries appeared to be indurated, the surface quite smooth, and the impression conveyed to me was one of atony or "lifelessness."

If corpora lutea existed in any of these ovaries they must have been embedded and atrophic. In no case was it possible to detect the presence of anything resembling a corpus luteum, even a centrally embedded one. Repeated attempts to induce return to oestrus by dislodging the corpus luteum (if it existed) by compression *per rectum* failed in every case.

No opportunity occurred of making a *post-mortem* examination of any of these cows but in a case described later in which pyometra had occurred as a sequel of trichomonas infection the corpus luteum was present in the ovary, embedded just beneath the surface of the tunic. It appeared to be atrophic and it was not possible to discern it in the substance of the ovary by palpation either *ante-* or *post-mortem*. The ovaries corresponded in every detail with the description given on clinical examination *per rectum* immediately prior to slaughter.

Subsequently cases exhibiting different symptoms occurred. A second-calf heifer developed the characteristic discharge for about two days when two months pregnant and then aborted the foetus complete in its membranes, this being immediately followed by a profuse fibrinous discharge. The following day, Mr. N. S. Barron, M.R.C.V.S. (whom I had invited to make microscopical examinations of the discharges from the cases available in view of our inability to demonstrate any organisms in spite of repeated examinations) visited the herd. In the fibrinous uterine discharge from this heifer trichomonads were first demonstrated in hanging drop preparations. All signs of this discharge disappeared in 48 to 72 hours. They were demonstrated at the same time, although much more sparsely, in discharges taken from the vicinity of the cervix of cow No. 6.

In five subsequent heifers with a similar history I found it possible to demonstrate trichomonads in the uterine and vaginal discharges.

Samples of discharges from two animals were sent to Dr. Stableforth early on March 15th, and an aborted foetus complete in its membranes on the 18th, but were not received until the following day and he was not able to detect any trichomonads microscopically or culturally.

In those cases in which it was possible to make an examination within one to two hours of the act of abortion a definite tenseness of the uterus was noted similar to that observed in those cases associated with inhibition of the uterus, but no abnormal enlargement existed.

A very close observation of the herd was maintained and directly suspicion of infection was aroused examination was made. I think that it is for this reason that the diagnostic symptom of marked tenseness was observed so constantly. It is a fact that this tenseness becomes less marked when resolution commences, and gradually subsides with the reduction in the size of the uterus.

In my experience of those cows in which inhibition of oestrus occurred, resolution had to be almost complete before return to oestrus followed. The ovaries gradually changed during the period of resolution; induration and atony disappeared slowly and ovulation followed.

On March 19th samples of discharges from ten cows and heifers which had been infected and blood samples from these ten and three other cows were forwarded to Dr. Stableforth. All proved negative to abortion and in no case was he able to demonstrate trichomonads. These animals had all received treatment.

Dr. Stableforth later visited the herd and took samples of discharges all of which proved negative when examined later in London. In all cases the animals had received treatment.

The prepuces of the three stock bulls were examined. There was no evidence of any abnormal preputial discharge and at no time had the owner noticed any abnormality.

All three bulls had served cows or heifers which subsequently proved to be infected with trichomonads. Their records showed that considerably reduced potency was evident over a period of months; but 16 heifers and cows calved quite normally subsequent to service by one or other of these bulls during the period at which the infection was at its peak. Recovery of potency followed treatment of the cows and the bulls and 19 of the 23 animals involved in this outbreak are definitely in calf to one or other of them.

Hanging drop preparations of the preputial secretions present were examined but all proved negative for trichomonads.

I interested Mr. R. W. Knowlton, M.A., M.D., B.Ch. (CANTAB.), M.C.O.G., Consultant Obstetrician and Gynaecologist, County Borough of Southampton, in these animals and he made an examination of them with me, taking samples of discharge for microscopical examination. In four cases the cultures were sterile and in one a non-haemolytic streptococcus was isolated.

Of the infected cows examined, the reaction of the vagina was strongly alkaline with a *p*H 8 to 8·5. This has also been noted in fresh cases met with since that time, the lowest reaction being a *p*H 7·5.

There was no evidence of vaginitis or corn- or seed-like reddish lesions which have been stated to be diagnostic.

The herd was placed under treatment and the infection appeared to be under control when on October 9th I was called in to see a heifer which was one of those previously infected and which had shown signs of abortion that morning and in which the preliminary mucilaginous discharge had been observed. I removed the foetus in its membranes complete and took samples of the fibrinous discharge and a blood sample for agglutination test for abortion. These were forwarded to Dr. Stableforth and were examined by him about four hours later. From these specimens he isolated trichomonads. This animal was three-and-a-half months in calf.

A week previously I had been called in by another client to see a cow which had been served on December 9th, 1935, and which was, therefore, about a fortnight overdue. Although she appeared to be heavy in calf she showed no signs of approaching parturition and had developed no udder. On examination *per vaginam* I found a small quantity of almost clear mucilaginous discharge; the cervix was closed but there was no uterine seal. On rectal examination only the body of the uterus could be palpated but it had the same characteristic tenseness that I had become accustomed to finding in cases of trichomonas infection. The size of the uterus corresponded to that of an animal due to calve but no calf or cotyledons could be palpated. The bifurcation of the uterine cornua could not be palpated owing to the size of the body of the uterus. I learned, with relief, that this animal was served by one of the bulls concerned in the previous herd. She had delivered a normal calf previously, having calved on October 28th, 1935. I communicated with Dr. Stableforth and suggested sending the cow up to the College for investigation, with the permission of the owner. This offer was accepted and trichomonads were subsequently isolated from the discharges. In the seven days that had elapsed the mucilaginous discharge continued, a small quantity being noticed daily on the tail and around the vulva and during that time the size of the organ had diminished considerably. On examination the day prior to being sent to London the uterus had reduced in size to that of an animal four to five months in calf. The bifurcation of the cornua could be palpated if the uterus were drawn back by fixation forceps and both cornua appeared of equal size. The same characteristic tenseness was present but was not so marked. This cow belonged to a small herd which was closely watched and housed each day. She had never shown any indication of abortion or return to oestrus.

At the same time the heifer which had aborted its calf at three-and-a-half months was also sent for observation. The first animal was killed and *post-mortem* examination made about three weeks later at the College. On rectal examination prior to slaughter the uterus was found to have still further reduced in size, corresponding to that of a cow three-and-a-half months in calf. The tenseness had almost disappeared. No foetus or cotyledons could be palpated. It was at that time by no means typical of the hyperplastic condition observed previously. The uterine cornua were equally enlarged. The ovaries were indurated and atonic and no corpus luteum could be detected. The mucilaginous discharge continued.

On *post-mortem* examination these observations were confirmed. The uterine cornua were short but equally enlarged and appeared to confirm the opinion I had perviously formed that the greatest enlargement occurs in the body of the uterus. Rectal palpation of the cornua is, in my experience, rendered difficult or impossible by the enlargement of the body of the uterus. In this cow pyometra had occurred as a sequel. No case of pyometra has occurred in the animals involved in the major outbreak.

Dr. Stableforth has dealt with this *post-mortem* examination in detail in the report of his investigation.

Two other cows, one served on July 2nd, 1935, and due in March, 1936, and another served on November 11th, 1935, and due in August, 1936, were observed to have the typical discharge: the former when eight months pregnant—the latter when due to calve. They both had the appearance of in-calf cows but examination revealed the presence of the vaginal discharge, absence of the uterine seal and the characteristic tenseness of the very greatly enlarged body of the uterus. They were kept under observation and no treatment was given. Occasional vaginal discharge was noticed but there was no return to oestrus. The uterus became somewhat smaller in both cases and the hyperplasia less. This continued until October, 1936, and still there had been no return to oestrus. A uterine catheter was passed but no discharge was obtained. A two-way catheter was passed and first warm water and later normal saline was used to irrigate the uterus. The water and saline both returned apparently the same with no indication of abnormal discharge. I came to the conclusion that the discharge present in the uterus was of the same type as the almost clear mucilaginous discharge noticed from the vagina.

Subsequently these cows were placed under treatment which is described later and both returned to oestrus the first week in December, 1936, for the first time since their service dates, but not until 14 days after the hyperplastic condition had disappeared under treatment.

Differential Diagnosis

Where an outbreak has become widespread in a herd the symptoms are so characteristic as to suggest trichomonas infection at once and the demonstration of the parasites in fresh hanging drop preparations excludes further doubt.

Contagious Vesicular Vaginitis can hardly be confused with trichomonas infection although freely transmissible by the bull. The symptoms are very acute, the marked inflammation in the vagina being accompanied by swelling and followed by vesicles or pustules which break and exude clear fluid, leaving ulcers. The cow exhibits great discomfort, swishing the tail continuously and is loath to move the hind-quarters—standing in a cramped position with the tail held away from the vulva in an attempt to relieve pain.

The disease is not associated with abortion or pyometra and multiple cases occur within a short period.

Granular Vaginitis is a name which does not appear to mean the same to all observers. To some it implies a contagious disease characterised by small reddish seed- or corn-like nodules in the vaginal mucous membrane, often in rows: many observers are emphatic that these should not be confused with the slight enlargement of small lymph follicles which are often normally present in the mucous membrane. Others frankly do not consider that such a disease as granular vaginitis exists. It is not associated with mucilaginous discharge from the vagina or with early abortion and pyometra. It has a tendency, in my experience, to clear spontaneously at parturition and then gradually to recur.

Bovine Contagious Abortion due to *Brucella abortus* should not be confused. Abortion in this disease usually occurs from the fifth month onwards—most commonly about the seventh month. An agglutination test of the blood or laboratory examination of the calf will differentiate.

Pyometra which may occur as a sequel in trichomonas infection may also occur due to other causes; but here again microscopical demonstration of the trichomonads is relatively easy. The typical discharge elaborated by the wall of the vagina is present and helps to aid diagnosis.

Endometritis is frequently met with, due to other causes, but is very infrequently associated with inhibition of oestrus. The herd history will give considerable help in deciding if trichomonas infection is likely to be present or not. The typical vaginal discharge is a constant feature which serves to distinguish trichomonas infection from all other diseases of the genital tract.

Frequent Return to Service is an indication of the possible presence of this disease in a herd. When occurring in the absence of brucella infection, the services having previously been satisfactory, the possibility of this disease being present should be suspected and steps taken, by examination of vaginal discharges, to determine whether trichomonads are present or not.

Treatment, Control, etc.

The insidious nature of the condition and the fact that the disease had not, to my knowledge, been reported in England led to considerable confusion of thought for some months. This was accentuated by my inability to demonstrate the organism responsible for the infection until the first case associated with abortion occurred. This inability was conduced to by the fact that microscopical examinations of the discharges were first made in smears and had not, until January, 1936, been made until eight to ten hours after the samples had been taken. It has also appeared, in my experience, far easier to demonstrate trichomonads in the uterine discharges in fresh hanging drop preparations than in the vaginal discharges, the organisms being much more numerous.

The herd involved was one of very high yielding cows in which every effort was made to prevent deficiency disease by the provision

of essential minerals and vitamins in the diet.

Theories held at various times until diagnosis was established were: Lack of vitamin E—the provision of which by intramuscular injections of wheat germ after the first oestral period had passed, subsequent to service, proved of no value.

Pseudo-pregnancy: The condition, however, did not appear to correspond with that met with in the bitch, in that, although the enlargement of the abdomen consequent upon hyperplasia of the uterus was present the cow did not exhibit any other symptoms of pregnancy such as enlargement and activity of the mammary glands. In addition, the sudden return to normal in the bitch is, in my experience, associated with the actual time the animal should have whelped and oestrus occurs at the normal period afterwards. In the first six cases met with in this outbreak return to normal was associated with sudden return to oestrus at varying periods of gestation from four to eight months and in other cases there was inhibition of oestrus for periods of ten months, 16 months and 18 months. In these cases associated with abortion, oestrus always occurred within 21 days of the act.

I first commenced to examine discharges for trichomonads in January, 1936, following a suggestion by Mr. L. P. Pugh, B.Sc., M.R.C.V.S., made in a private communication through Mr. J. F. D. Tutt, F.R.C.V.S. The cases available to start with were all old ones which had received treatment, and all proved negative. The first case in which abortion occurred confirmed the presence of trichomonads in the uterine discharges and subsequently every fresh case proved positive for these organisms when the discharges were examined without delay in fresh hanging drop preparations. In those cases in which abortion occurred oestrus followed within three weeks and subsequent to oestrus the discharges tended to clear up and there was a fairly rapid return to normal. Usually all discharges ceased following a second oestral period. It would appear from clinical observation that the infection has a natural tendency to subside following the onset of oestrus: this opinion is supported by the fact that in the first case observed the cow was served within 21 days of her first return to oestrus and yet held to service and subsequently delivered a normal live calf. The second cow similarly held to her first service after a period of six week—the first and second oestral periods being missed. Subsequently experience tended to indicate that the infection may, in a proportion of cases, remain latent in the vagina and uterus and recrudescence occur following fecundation with a return of clinical symptoms and for this reason routine treatment of every animal in which the condition was diagnosed was given. In addition the danger of pyometra occurring as a sequel in those cases in which inhibition of oestrus occurred was realised.

The method of control put into force was to divide the herd into three distinct sections: (1) Heifers which had never been served; (2) cows and heifers which had calved normally; (3) cows and heifers which had been or were infected. The three stock bulls were isolated and treated by preputial douches. Their records were carefully gone into and one of the three which appeared to be least associated with the cases which had occurred was kept for subsequent use on this third group at the appropriate time. A fresh young bull which had never been utilised for service was allocated to each of the other groups. All animals which had been infected were suspended from service for three months and during that time received treatment. It was essential, in view of the fact that this was a commercial herd, to maintain milk yields as far as possible. For this reason, in view of the conclusion arrived at that return to oestrus was associated with a natural tendency for the infection to subside, it was decided to attempt to induce a more rapid return to oestrus in those animals in which oestrus was delayed. This proved at first to be very difficult. Expression of the corpus luteum by compression of the ovary *per rectum* proved to be impossible and ovarian massage at regular intervals appeared to have no effect. Injections of anterior pituitary extract, contramine, thyroid and posterior pituitary extract similarly proved of no value. It had been claimed by a German observer that Lugol's iodine was a specific for this condition. A Neelsen's tube was passed through the closed cervix and 100 to 150 c.c. of 2 per cent. Lugol's iodine was injected and allowed to remain; this was repeated in the earlier cases at intervals of five to seven days for three to four injections on cases in which discharge associated with inhibition of oestrus was noticed. There was no apparent response to treatment.

A solution of Metaphen (Metaphen Laboratories, Ltd.), which has been used with success in the treatment of the condition in the human in America was next tried. It is an alkalinised solution of an organic mercury compound 4-Nitro-anhydro-hydroxy-mercuri-ortho-cresol. One hundred and fifty c.c. of a 1: 1,000 solution was injected through the closed cervix and the injection repeated at seven-day intervals. A gradual diminution in the tenseness of the size of the uterus resulted and return to oestrus followed in the first three cases treated within six weeks of the first injection. These cases had all been treated previously with Lugol's solution of iodine, 2 per cent.

The injection had the advantage of being non-irritant and consequently unproductive of the

pain and violent expulsive efforts associated with injections of Lugol's iodine.

Douching the vagina with 3 to 5 per cent. lactic acid, on the suggestion of Dr. Knowlton, while resulting in a cessation of the vaginal discharge as long as it was maintained at intervals of two days, was not associated with a return to oestrus. Similarly, prolonged, treatment of the vagina with Devegan (Bayer) proved of no value in cases exhibiting an oestrus.

Following return to oestrus the cases were retained under observation until the next oestrus and if that came at a normal period (19 to 22 days) and clinical examination revealed no abnormality, they were served at the subsequent oestrus. Our experience, then, was that the majority of cows did not hold to service and for that reason a further intra-uterine injection of Metaphen 1 in 1,000 or Lugol's 1 to 2 per cent. was given subsequent to the first oestral period and a rapid return to oestrus induced by expression of the corpus luteum of oestrus by rectal compression of the ovary. This induced return to oestrus in three to five days. The cows were, however, not served until the following oestrus and 80 per cent. held to service at that time.

Later it was decided to try intra-uterine injections of lactic acid—at first a 1 per cent. and later a 2 per cent. and then a 3 per cent. solution was used. This treatment proved to be associated with the onset of considerable expulsive efforts and the usual symptoms of slight abdominal pain which, however, only lasted about 30 minutes and which were far less severe if the cow had been kept short of food for a few hours and was allowed some directly the treatment had been given. A more rapid return to normal followed—the diminution in the tenseness and size of the uterus was very apparent even after one treatment and with repetition of the treatment at five- to seven-day intervals, return to normal occurred after three to five treatments. Oestrus did not recur in any case in under six weeks from commencement of treatment.

Two cases treated in this way were those in which oestrus had not occurred for 11½ to 15 months respectively. Both were in oestrus within six weeks of commencing treatment. The bulls involved were douched once a week with a 5 per cent. solution of lactic acid. All cows which had the abortion type of the disease were given three or more treatments at intervals of seven days and not served until the oestrus subsequent to all signs of vaginal discharge having disappeared.

Methods of control used since are: The routine douching of the stock bulls with 5 per cent. lactic acid solution; the insertion of pessaries containing lactic acid and boracic acid in cocoa butter base *in all cows* and heifers directly they have calved and cleansed; douching of the vagina of all cows with lactic acid solution 5 per cent. once weekly for three weeks before the intended date of service, the last douche being timed to be given about two days before due in oestrus.

The lactic acid solution has a very marked effect on the discharge, which is immediately coagulated into a mass which is expelled with the injection or can easily be removed by hand. The vagina is left free of all discharge and comparatively dry. There is almost immediate contraction of the cervix. (I have since used lactic acid solution in the treatment of cervicitis unassociated with trichomonas infection with very satisfactory results.)

Following service the cows involved were examined at frequent intervals for pregnancy. In every case, except one, the presence of the uterine seal could be detected between five and seven weeks. In one case only it could not be detected until the tenth week. No abnormal discharge was found—there being the normal diminution and increased adhesiveness of vaginal discharge noticed in pregnancy. On rectal examination one cornu of the uterus is found in early single foetus pregnancy to be much more greatly enlarged than the other and on palpation gives one the impression of a comparatively thin membrane containing fluid, in contra-distinction to the tense enlargement of both cornua noted when infected with trichomonads. Nineteen animals of the 23 concerned in this outbreak are definitely in calf at varying periods of gestation or have calved. Three have delivered live calves at full term and in some of the others it is possible to palpate the foetus—gestation being sufficiently advanced. They were all served by one or other of the three stock bulls involved, all of which had received the treatment described. One early case treated again aborted a calf at three-and-a-half months gestation and infection with trichomonads was confirmed by microscopical examination. (This foetus was the one in which Dr. Stableforth first demonstrated trichomonads and it was on account of this recrudescence of infection that routine treatment of all animals in which the disease was diagnosed was commenced and persisted with. No further cases of recrudescence of infection have been met with since.)

Conclusions

Trichomonas infection of the vagina and uterus of the cow exists in the country and is responsible for a specific contagious disease.

The infection is transmitted by the bull in copulation and prior to its clinical recognition may be associated over a period of months with considerably reduced fertility which is regained following recovery of the cows, and treatment of the bulls. The reduced potency, in my

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opinion, would appear to be due to the abnormal condition produced in the cow; the part played by the bull in the transmission of this disease being, apparently, purely mechanical.

The disease is characterised by an almost clear mucilaginous discharge from the vagina, occurring subsequent to copulation and associated either with abortion in the early part of pregnancy within two or three days of the onset of the discharge, followed by return to oestrus within 21 days, or inhibition of oestrus for varying periods with persistence of the discharge, dissolution of the uterine seal and a characteristic enlargement of the uterus—particularly the body of the uterus—the size of the enlargement corresponding approximately with the period of gestation at the time of examination.

In the outbreak under review every animal in which abortion occurred returned to oestrus within 21 days. The vaginal discharge persisted until that or the subsequent oestrus and in some cases longer if not treated. The uterus appeared normal on clinical examination a day or two later but in those cases examined immediately following the act of abortion tenseness was noted.

I am satisfied that in those animals in which inhibition of oestrus took place, no abortion occurred. Very close observation was maintained and against this theory is the fact that oestrus was absent whereas in cases associated with abortion rapid return to oestrus followed.

It would appear that fecundation actually occurs and that very early death of the foetus *in utero* follows, associated with anoestrus and the inhibition of the normal signs of advancing gestation. The discharge, the absence of the uterine seal and the characteristic tense enlargement of the uterus associated with inhibition of oestrus are diagnostic of this form of the disease. The discharge early in pregnancy, associated with abortion of the foetus within two or three days of its onset, and its persistence after the act until oestrus occurs, or longer, is clinically diagnostic of the other form. Pyometra is a possible sequel of the former condition. The vaginal discharge is, in my opinion, elaborated by the wall of the vagina and the cervix. The enlargement of the uterus would appear to be, for the main part, due to hyperplasia.

It has not been possible by compression or irrigation to obtain any proof that sufficient discharge is present in the uterus to account for the whole of its enlargement. The discharge that does exist appears to correspond with that met with in the vagina in both forms of the disease. Diminution in the size of the uterus is not associated with increase in the amount of vaginal discharge.

The disease has a very serious economic aspect in view of the loss of calves, sterility and long dry periods induced and consequent interference with milk yields. In the outbreak described the loss due to depreciation, loss of sales, calves and milk amounted to over £2,000.

Due to the insidious nature of its onset it tends to become widespread in a herd before it is recognised. Consequently when it does occur it is likely to be associated with extensive loss.

I must record my thanks to Mr. L. P. Pugh for various suggestions made in communications through Mr. J. F. D. Tutt; to Mr. J. F. D. Tutt for a number of interesting discussions on the subject; to Mr. N. S. Barron for his visit to the farm and his help in first demonstrating the trichomonas; to Mr. R. Knowlton for his interest and many discussions regarding an infection with a similar organism which occurs in the human (which will be described in an article written by him) and to Dr. Stableforth for his enthusiastic co-operation.

* * * * *

Laboratory Data

by

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Black Heifer (*see* Gould, description of outbreak)

This animal aborted a small foetus at three-and-a-half months on October 9th, 1936. The foetus was received the same day together with three samples of discharge and was enclosed in the intact membranes which were normal in appearance but had a faint sweetish and slightly stale odour. No signs of putrefaction or pus formation were present.

Two samples of discharge were fluid and resembled colostral or bad mastitis secretion which on standing separated into an upper nearly clear yellowish portion and a lower third composed of tenacious floccules. The third sample was clearer but more mucoid. All showed numerous active pear-shaped trichomonads under the one-sixth inch lens; samples 1 and 2, three to five, the more mucoid sample (3), one or two per field. Material incubated at body temperature overnight was much richer, showing 10 to 15 trichomonads in every field.

On October 12th, the heifer was kindly sent to the College for observation. Rectal examination the following morning showed little or no abnormality. A few c.c. of whitish mucoid material containing small white flakes was obtained from the vagina. The *os* was already nearly closed. The material obtained showed a small number of typical trichomonads. From the date of arrival until she was returned on November 20th no discharge was seen. She

came into oestrum on October 26th, and on the 28th rectal examination showed no abnormality.

She had been examined daily during the first week and at bi-weekly intervals during the next two weeks. A small amount of mucoid material was obtained from the vagina on four occasions, the last being on October 26th. The successive samples were progressively clearer and more mucoid, the last showing a few tiny whitish flakes only. A few trichomonads were seen on October 15th and long search showed two on the 17th but thereafter they were not again found.

This case is typical of the quick resolution which frequently occurs after an early abortion of the foetus intact in its membranes.

Fawn Cow (*see* Gould, description of outbreak)

This cow, of which the earlier history and clinical details have already been given, arrived on October 12th, being then more than a month overdue. Rectal examination the following morning showed the tense enlargement of the uterine body already described by Mr. Gould. No calf could be palpated, nor could the bifurcation of the horns be felt. The cervix was closed and the external *os* contained a small amount of discharge. About 40 c.c. was also obtained from the vagina. It was yellowish white, consisted of very tenacious flocculent clots with a small admixture of clear mucus, and showed large numbers of trichomonads.

Further examinations were made daily during the first week and then at bi-weekly intervals until the cow was slaughtered on October 28th. Discharge was not at any time profuse and, beyond a mere trace on the tail occasionally and a very small amount obtained *per vaginam* on three occasions, none was seen until the morning of October 26th, when the cow was found lying with a pool (about half a pint) of discharge behind her. About 60 c.c. of discharge consisting of clear or whitish mucoid material and about an equal proportion of yellowish-white clotted material was removed from the vagina with precautions to avoid contamination. The cervix again contained a plug of discharge. At examination per rectum the body of the uterus was still enlarged and tense, though less so than earlier, and the cornua were also thickened to some extent. Examination of the discharge showed numerous trichomonads whose motility was sluggish on account of the mucoid nature of the material, the movements of the undulating membrane giving often the appearance of pseudopodia.

Examination was again made with Mr. Gould on October 28th immediately before slaughter. The uterus was then still further reduced in size and tenseness, corresponding then to that of an animal about three months in calf. It was otherwise as on the 26th. The ovaries were normal.

Post-mortem Examination.—The genital tract was tied off below the cervix and removed. No abnormality was observed in any other organ. The uterus was enlarged, the body being between three and four inches in diameter and about six inches long and the horns over two inches in diameter at their middle portion, and shortened in appearance. The body was markedly firmer to the touch than is normal due to the pronounced thickening of its walls which were over half-an-inch in thickness. The cornua were more fluctuating but the walls were also thickened, being approximately a quarter-of-an-inch. The mucous membrane showed a number of haemorrhagic points and splashes. The cavity was filled with thick clotted material which, on standing in a glass, separated into an upper fluid, almost watery, portion of a slightly greyish-yellow colour, and a lower portion which consisted of tough yellowish-white clots forming about three-quarters of the whole. Large numbers of trichomonads were present in both portions, motility being rather sluggish. The clear mucoid portion of the earlier discharges had presumably come from the cervix and vagina. The main pathological changes were in the body and cornua, the upper parts of the tract, including the ovaries, appearing normal. A corpus luteum was embedded in the right ovary. Portions of the uterus and of the mammary, iliac, inguinal and mesenteric glands were removed for cultivation experiments and histological examination.

Cultivation Experiments

Attempts to obtain pure cultures of trichomonads were made from the aborted foetus and discharges from the "black heifer" on the day of abortion (October 9th), and from discharges from the same animal four days later; and from the "fawn cow" on October 13th, the day after arrival, and on two other occasions, the last being *post-mortem*. Precautions were taken to avoid contamination as far as possible.

Serial sowings were made on Locke's egg saline medium with and without a few drops of defibrinated ox blood and in blood broth and serum broth and on blood agar plates, and incubated at 37° C. The blood agar plates showed in each case a small number of bacteria, none of which were, however, of a kind or in such numbers as to suggest any association with the disease but which eventually overgrew the trichomonads. Rich growths of trichomonads were usually obtained in all other media, reaching their optimum at about 48 hours. Sub-cultures were made at intervals and three cultures were carried to the fourth generation at which stage the bacteria, which had increased at each generation, prevented further

growth of the trichomonads. It was, of course, not surprising that various bacteria were present in discharge obtained *per vaginam* but it had been hoped that the material obtained directly from the uterus of the "fawn cow" might be bacteria free. The blood agar plates from this, however, showed a few colonies of bacilli and staphylococci and, although the trichomonads were present in fairly large numbers, they were gradually overgrown. No growth was obtained in tubes of media sown with the smaller inocula, 0·01 c.c. or less. It is curious that in most cases initial cultures were only obtained from tubes sown with 0·01 c.c. or more in 5 c.c., although the inoculum was fairly rich in trichomonads.

Inoculation of Small Animals

In an attempt to maintain the trichomonads, 16 guineas-pigs and three rabbits were inoculated with natural material or with rich cultures, *viz.*, three guinea-pigs and three rabbits *per vaginam* and 13 guinea-pigs (four believed pregnant) intraperitoneally. The dose given intraperitoneally varied from 5 c.c. to 1 c.c.; that put in the vagina was about 0·5 c.c. in rabbits and less in guinea-pigs. Trichomonads were still present in two guinea-pigs and one rabbit treated vaginally, two days later, but were not seen again. Two guinea-pigs died from other causes and the remaining animals were killed at intervals up to three months. Trichomonads were not found in any. One of the pregnant guinea-pigs had two normal young ten days after inoculation intraperitoneally, the other two supposed pregnant guinea-pigs were presumably not pregnant because no young were even seen and the uteri of both were normal *post-mortem*. The results, though disappointing, are in accordance with the fact that other workers have only been able to transmit the infection to laboratory animals in a small proportion of cases, although, if infection is once established in guinea-pigs, little difficulty is apparently found in carrying it on in series.

Microscopic and Cultural Examinations of Other Cases

Material from 13 other cases was examined microscopically and culturally for trichomonads and bacteria. In one case a few trichomonads were found in a direct smear, and in another after overnight incubation in serum broth. The remainder, already referred to by Mr. Gould in his description of the outbreak, were negative for trichomonads. The majority were, however, from treated cases or from cows in which the acute phase of the disease had passed and of the mucoid variety.

Most samples have shown a small number of bacteria, usually non-haemolytic streptococci, but no evidence has been obtained of the presence of any organism considered likely to be responsible for the disease. Blood samples examined for evidence of bovine contagious abortion (*Br. abortus*) have been consistently negative.

. . . . .

Histological Examination

(By E. G. White)

The pathological histology of *Trichomonas foetus* infection has, as far as we have been able to judge from a search of the literature, received very little attention.

Abelein (1932) gives a brief record of the histological examination of an infected uterus. The cow had been served two months previously by an infected bull, and had to be slaughtered on account of acute tympany. The uterus contained about 50 c.c. of a thin, yellowish, opaque secretion. This fluid contained enormous numbers of trichomonads and leucocytes. The mucous membrane was more red than in the normal pregnant uterus. Histologically, the normal columnar epithelium was almost entirely absent, being represented merely by small areas lining the ducts of the uterine glands. The mucosa was densely infiltrated with cells—neutrophil leucocytes, erythrocytes, and, especially, eosinophil leucocytes. The blood vessels in the mucosa were congested and small haemorrhages were present. No trichomonads could be demonstrated in sections.

Lwoff and Nicolau (1935) were able to produce severe encephalomyelitis in various laboratory animals by subdural inoculation of *T. foetus*. In a subsequent paper (Nicolau and Lwoff, 1935) they recorded the clinical symptoms and histological findings following subdural inoculation into the rabbit, guinea-pig, rat, dog, monkey and hen. In all animals, except the rat, there resulted a meningo-encephalomyelitis, which was either subacute, acute or chronic, according to the number of flagellates inoculated and the natural resistance of the animal. The parasites were demonstrable in huge numbers in the cerebral ventricles and they also invaded the cerebral grey matter with subsequent destruction of this. The reactive changes which resulted varied according to the species of animal and the extent of the infection. In acute cases, *e.g.*, in rabbits dying within 48 hours, there was intense cellular infiltration consisting of polymorphs and relatively few mononuclear cells. As the time of survival increased the ratio of mononuclear cells to polymorphs increased. The former comprised lymphocytes, plasma cells and macrophages. In addition there appeared giant cells within whose protoplasm were to be found the parasites. In rabbits dying between 8 and 21 days after inoculation, the reaction was almost entirely mononuclear with mantles of these cells around the vessels. Finally, in animals killed about a year after inoculation, no trace of parasites was obtained but evidence of previous reaction was to be found in foci of glial proliferation and fat granule cells.

Material from the uterus and a number of lymph glands of one cow ("fawn cow") has been examined and, although no definite conclusions can be based on a single case, it is of interest to record the findings briefly.

In histological section, the epithelium of the uterine mucosa varied considerably in appearance in different blocks of material. In some,

it consisted of several layers of cells (so-called pseudo-stratified epithelium) and it should be pointed out that this is the normal epithelium in the cow—not simple columnar as described in Abelein's paper. The epithelium was everywhere infiltrated with neutrophile and eosinophile leucocytes. In other sections, the epithelium was lacking, although the material was fixed immediately after slaughter, and there can therefore be no question of *post-mortem* changes. Immediately beneath the epithelium was the normal fibrous layer of the mucosa, densely infiltrated with cells and containing the ducts of the uterine glands, the epithelium of the latter always being intact. Here, and in the underlying reticular zone of the mucosa, were foci of dense cellular infiltration, usually forming a thick mantle around congested blood vessels. The cells were lymphocytes, plasma cells, histiocytes, neutrophiles and eosinophiles. Plasma cells were found in very large numbers in the mucosa. Eosinophiles were present in enormous numbers scattered diffusely throughout the whole wall of the uterus, and in the perivascular foci of cellular infiltration. In preparations stained with Giemsa, many basophil leucocytes (mast cells) were seen beneath the epithelium, in the adventitia of blood vessels throughout the uterine wall, and in enormous numbers in the serosa. No giant cells were seen and special staining failed to reveal the presence of trichomonads in any of the sections examined.

The relative thicknesses of the mucosa and muscularis were within the limits usually considered normal. The circular muscle, embedded within which was the vascular layer, was diffusely infiltrated with eosinophiles as also was the longitudinal muscle coat (derived from the ligamentum lata) and its covering of peritoneum.

The uterine glands dipped down into the depths of the mucosa and even between the bundles of the circular muscle layer. Their epithelium was intact and their lumen was usually filled either with neutrophiles or with desquamated epithelial cells, or both.

All the lymph glands examined (iliac, supramammary, and mesenteric) showed a marked infiltration with eosinophiles, especially pronounced in the capsule and trabeculae. Under high magnifications these cells showed the nuclei and eosinophil granules typical of eosinophile leucocytes. The intensity of the infiltration in the glands and uterine mucosa was very similar to that found in the interlobular connective tissue of the liver of the pig affected with parasitic cirrhosis.

The histological changes described are those of a chronic endometritis, a feature of which is an intense eosinophile infiltration. The lymphatic glands examined also showed a striking degree of infiltration with these cells.

In the uterus, large numbers of trichomonads were found, unaccompanied by any bacteria which could be considered to be of significance. Whether there exists any relation between the presence in the uterus of trichomonads and an eosinophile infiltration of its wall and various lymph glands, must be left for further investigation. No conclusion can be drawn from the examination of a single case.

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Trichomonas Vaginalis Infection in the Human

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The *trichomonas vaginalis* was first identified by Donné in 1836 and for some years Continental writers have stressed the importance of the organism in association with abnormal vaginal discharge. In England, however, only within the last year or two has any pathogenic action of this parasite been recognised.

The organism is best detected by immediate microscopic examination with the dark ground condenser of a loopful of discharge on a slide. For permanent specimens films may be stained by the May-Grunwald-Giemsa technique. The parasite appears as a pear-shaped body provided with three or four anterior flagellae with a larger flagellum extending posteriorly along the border of an undulating membrane. It is actively motile and can be seen propelling itself about the field amongst leucocytes which are smaller in size. Certain annular forms—Ringkörper—are also described (Hogue).

The incidence of the infection has not been estimated but it would seem that in about 20 per cent. of cases of abnormal vaginal discharge investigated by various observers the trichomonas has been isolated in pure culture while it has frequently been found in association with other organisms. The parasite has been found in the discharge of a certain proportion of pregnant women.

The mode of entry to the human vagina has not been definitely established. The organisms have been isolated in a few cases from the male but contact infection has not been definitely proved. Spread from the lower intestinal tract is a possibility, as the *Trichomonas faecalis* is frequently found around the anus. Some maintain that infection may be spread by swimming pools.

The *Trichomonas vaginalis* thrives in alkaline media and is killed in acid media. The optimum *p*H is between six to seven. The vaginal reaction of the normal human is slightly acid, *p*H four to five, the result of a balance of the alkaline secretions from the cervical glands and corporeal endometrium and

the acid transudation from the vagina. The reaction may become alkaline—alkaline tide—a few days following menstruation when there is a relative increase in secretion from the uterus and cervix.

The acidity of the vaginal transudation is due to the presence of lactic acid sufficient in amount to inhibit the growth of pathogenic organisms. The lactic acid is produced by the splitting up of the glycogen contained in the cells of the vaginal epithelium by the Doderlein bacillus, a normal inhabitant of the vagina. The supply of glycogen to the epithelium is thought to bear some relationship and to be controlled by the amount of folliculin present in the body and this fact has been tested with success in the treatment of certain types of leucorrhoea in which the vaginal reaction is alkaline. In practice it is necessary to administer large doses of follicular extract to increase the glycogen in the vagina available for the production of lactic acid. The normal reaction of the vaginal secretions of apparently healthy cows tested was *p*H six, and it is of interest to record that in all the infected cases examined, the reaction was strongly alkaline with a *p*H 8 to 8·5.

There is now general agreement that the *Trichomonas vaginalis* is capable of giving rise to a pathological condition in the human vagina and *cervix uteri* characterised by some degree of inflammatory reaction resulting in a thin, profuse, yellow discharge with a peculiar frothy appearance. The discharge causes much irritation and excoriation of the vulva, giving rise to pruritus vulvae and ani.

Hees (Gynaecologie et Obstétrique, September, 1936) states that he has found the parasite in the uterus in cases of endometritis, in placentae, in the Fallopian tubes in cases of chronic pyosalpinx, in the blood, in ovarian tumours and in the peritoneal cavity and he even goes so far as to suggest that the peritoneal metatases in carcinoma may be due to spread by this organism.

Hees maintains that infection in pregnancy is followed by abortion in the majority of cases. G. Tempé (*Ibid*, p. 201), of Lausanne, writes, "These statements appear to us extremely important and seem to show that the study of the pathogenic action of the trichomonas is far from exhausted."

In contrast to these statements other observers maintain that the *Trichomonas vaginalis* is non-pathogenic and that the primary cause of the vaginitis is an infection by a non-haemolytic streptococcus. With this in view, cultures were made from the cervices of the infected herd and in four cases the cultures were sterile while a non-haemolytic streptococcus was isolated from the fifth case.

The local measures of treatment in the human have for object the restoration of the normal vaginal acidity, and in this respect lactic acid, either in the form of douches or pessaries, is of great value. Devegan (Bayer) has to some extent replaced the older methods of treatment and its results are due in the first place to the boric acid component, in the second to carbohydrates which have been broken down by a special process and in the third to the presence of an arsenic compound.

B C G VACCINATION OF INFANTS

The *British Medical Journal* recently referred as follows to an important experiment carried out during the past eight years in New York by Kereszturi and Park* to ascertain the real value of B C G vaccination of children, which, though introduced in 1924 has only within the past few years been the subject of such carefully controlled experiments: "The experience of these workers on a total of 690 vaccinated infants and children, all of whom were born into tuberculous families, indicates that the vaccine is harmless for human beings, though when administered parenterally it not infrequently gives rise to a cold abscess that may persist for several months. These 690 children were divided into two groups. One group, comprising 269 infants, were vaccinated by the oral route during the first ten days of life. The other group, comprising 421 infants and children, most of whom were less than one year of age, were vaccinated either intracutaneously or subcutaneously; all of these were shown to be tuberculin-negative when they first came under observation. Control cases, 345 and 410 in number, were selected to correspond as closely as possible with the subjects in the two vaccinated groups. The children have been followed up with great diligence, and the results are now presented. The tuberculosis death rate in the orally vaccinated group was 1·1 per cent., in the control group 2·6 per cent.; in the parenterally vaccinated group it was 0·7 per cent., and in the control group 2·7 per cent. Combining these two groups, the tuberculosis death rate was 0·9 per cent. in the vaccinated as compared with 2·7 per cent. in the control group. Analysis of these figures showed that the observed difference of 1·8 per cent. was 3·9 times the probable error—a difference that might be expected to occur by chance alone less than one in a hundred times. Although the control subjects were on the whole exposed rather more frequently than the vaccinated to contact with open tuberculosis, reasons are advanced to show that this was not likely to account for the difference in behaviour of the two groups. Discussing these results, the authors point out that the tuberculosis death rate in children of tuberculous families in New York City is 2·7 per cent. during the first year of life, while in the general population it is only 0·06 per cent. In the children of 'open' tuberculous families it is 7·2 per cent.—that is, 120 times as high as in the general population. In their opinion this mortality is serious enough to justify the routine vaccination—preferably by the parenteral method—of all children born into tuberculous families. The data now provided suggest that by this means the tuberculosis death rate could be reduced to one-quarter of its present figure. By combining B C G vaccination with removal of the infants from their parents until allergy had become established, it might be possible to effect an even greater reduction."

*Amer. Rev. Tuberc. October, 1936. p. 437.

Field and Laboratory Diagnosis of Disease in Sheep Flocks*

R. S. ROBERTS, F.R.C.V.S.

In this paper it is proposed to review the means at our disposal for the diagnosis of those diseases of sheep which affect several members of the flock within a short period of time and to attempt to arrive at a definition of what may be termed the "minimum requirements" for making a diagnosis. Owing to the fact that many of these diseases affect the flock over a period of one to two weeks only, the forming of a tentative diagnosis, upon which prophylactic treatment may be instituted, is of the greatest importance, while as many of them recur each year, or affect a large number of flocks in the same area, it is equally important to confirm the diagnosis. We have at our disposal four avenues by which a diagnosis may be arrived at, namely, consideration of the history of the outbreak, clinical examination, *post-mortem* examination in the field, and, finally, laboratory examination supported by bacteriological study and animal inoculation.

Those diseases which are of importance in south-west England will be considered, in the order of their age incidence.

Lamb Dysentery

A suspicion of the nature of the disease is frequently aroused by a history of an unduly high death-rate in lambs under a fortnight old. The owner may attempt to convince himself that the mortality is due to lack of milk or to some "weakness" in the ewes. This is especially so in those outbreaks where very little dysentery is observed. A diagnosis is quickly arrived at by *post-mortem* examination, if the characteristic haemorrhagic ulceration of the mucosa of the small intestine is discovered, and prophylaxis by serum inoculation can be commenced immediately. When the disease appears in an area for the first time it is advisable to send a carcase, or intestinal contents preserved with chloroform, to a laboratory so that a search may be made for the specific toxin or organism. This procedure is advisable in this area because an enteritis affecting lambs born on arable ground may be suspected as lamb dysentery; the benign nature of this condition and the absence of ulceration in the intestine may be sufficient to differentiate it, but there are outbreaks in which a high mortality is sustained.

Pulpy Kidney Disease of Suckling Lambs

There is reason to believe that there is no well-defined line of demarcation between this disease and lamb dysentery. Cases diagnosed in the field as lamb dysentery may be shown, by laboratory examination, to have been caused by *Cl. welchii* type D, while conversely, the type B organism may be isolated from cases of sudden death in lambs over three weeks old.

The history is of considerable value in diagnosis. The disease occurs in thriving lambs, from a month to two months old. In the majority of cases death takes place within 24 hours of the first manifestation of symptoms, but there are cases with a longer duration of illness. About 80 to 90 per cent. of the lambs affected are single lambs. High rates of mortality are usually associated with early lamb production and lambs born after the middle of March, except on hill pastures, are seldom affected. The disease is not frequently encountered at this age in lambs born on arable crops. The value of the history is enhanced by the fact that no other disease of importance has been shown to cause death in lambs of this age in this area and, further, by the fact that an immediate diagnosis is called for, the duration of the outbreak being frequently less than one week. The pulpy condition of the kidney is the result of early *post-mortem* decomposition and it is not seen in an animal examined immediately after death. Excess of fluid in the pericardial sac is a common but not invariable lesion. Laboratory examination of intestinal contents for toxin is usually satisfactory, but again a negative result, especially when dealing with old *post-mortem* material, is of little value. In this connection it is worth noting that the D type of toxin associated with pulpy kidney disease withstands destructive agents to a far greater extent than the B type. (The B type organism produces a small proportion of D toxin, whose toxic action is increased forty-fold by the presence of intestinal contents. Hence, in cases of lamb dysentery it is probable that putrefaction may destroy the other fractions, leaving only the D fraction in demonstrable quantity.)

Pulpy kidney disease also occurs in lambs of all ages on arable crops. It frequently, but not invariably, occurs within a week or two of

*Presented at a meeting of the Western Counties Division, N.V.M.A., held at Taunton, October 21st, 1936.

changing from one crop to another and again affects lambs in thriving condition. There is an essential difference in the history of the disease under these conditions: it occurs as a sporadic outbreak, in contrast with its regular seasonal appearance in suckling lambs in grass flocks. There is also a greater danger of a mistaken diagnosis, as it may be confused with acute digestive disturbances following over-feeding. Further investigation is necessary before the two conditions can be clearly differentiated on the basis of history and clinical examination. As a large number of animals may die within a period of two or three days, a diagnosis on the farm, even though it may be a tentative one, is of considerable value. If the facts have been carefully examined and the condition of the flock noted it is justifiable to adopt preventive measures even if it is the history alone which suggests the diagnosis.

Gastric and Intestinal Parasites

Of all diseases encountered in young sheep it is this which causes most difficulty in diagnosis, the chief reason being that the degree of infestation which may be regarded as sufficient to have a material effect upon the animal's health cannot be defined.

Features in the history of the outbreak which may indicate parasitic infestation are the degree to which the land is stocked, the length of time for which pastures are free of sheep during the year, the system of grazing or folding followed and the quality of the pastures. It is probable that close grazing of a pasture is more conducive to parasitism than the mere confinement of sheep within a small area of land. It is a remarkable fact that the disease does not occur on land which is stocked for six months only in the year, as on wintering farms. In south-west England, and more especially in Devon, the prevailing method of winter folding on roots invites parasitism, the lambs being allowed to run backward over contaminated land until the whole field has been eaten. Where the short leys are preserved for the lambs in autumn it is possible that the accumulation of parasites occurs while they are on permanent grass in late summer. It is a mistake to assume that scouring is an invariable symptom; in severe outbreaks the loss of condition is unmistakable, but the farmer frequently complains of a lack of bloom, a failure to fatten in a normal manner, or that in summer-fattening lambs the time at which they can be disposed of becomes later than in previous years. These less pronounced effects are difficult to appreciate by persons who are not in constant attendance upon the flock. The number of ova passed in the faeces by affected animals is an unreliable guide and varies within wide limits in the same animal. Owing to the infrequence with which *Haemonchus contortus* is the predominating parasite, a rough *post-mortem* examination carried out at the farm is unsatisfactory unless it is intended to remove material for further examination. The only satisfactory method of diagnosis is to count the number of worms in the abomasum and in the first portion of the small intestine and to identify the predominating species. This requires laboratory equipment and a certain amount of specialised training. The value of an indisputable diagnosis lies in the fact that the anthelmintics at our disposal are imperfect, and the owner feels disinclined to persevere with them unless he is convinced that the diagnosis is sound.

A brief experience of these cases in a laboratory is sufficient to reveal the fact that in spite of the thoroughness of the technique, unexpected difficulties arise: emaciated carcases from typical outbreaks are found to harbour very few worms and one wonders whether the smaller worms have disintegrated with putrefaction; there may be a possibility that the sheep have already been treated with anthelmintics; the case one has elected to examine may not be typical of the disease affecting the flock.

The condition of the lambs is usually sufficient to differentiate intestinal parasitism from pulpy kidney disease.

The diagnosis of parasitic gastro-enteritis should be based on a general consideration of history, symptoms and *post-mortem* examination. The disease is sometimes unexpectedly encountered in adult sheep and the clinician has to guard against confusion with Johne's disease. The examination of a smear made from the faeces and stained by the Ziehl-Neelsen method is a sufficient precaution because the organism is easily demonstrable in the faeces of sheep.

Husk

When the disease is caused by *Protostrongylus rufescens*, lambs may die after a very brief period of illness and a cursory examination may suggest a diagnosis of bacterial pneumonia. This can be avoided by meticulous examination of the borders and apices of the lungs.

"Pining" in Ewes and Lambs

Certain grazing areas have a reputation among the agricultural community of causing a "pine" if sheep are left upon them indefinitely. On certain parts of Dartmoor it is imperative to remove sheep to other grazings at least once each year, and a few cases of pining occur within ten months. "Pining" can only be regarded as a definite entity in any area when investigation has shown that no parasitic agent is responsible for the disease and it is only when such an investigation has been conducted that the possibility of the existence of a true deficiency pine may be considered.

In-lamb Ewe Disease or Pregnancy Toxaemia

The history is frequently a reliable guide to the diagnosis of this condition, and confirmation may be obtained by clinical and *post-mortem* examination. Our knowledge of the pathology of the disease is still too uncertain to utilise in a practical manner for purposes of diagnosis.

The first symptoms are usually observed a fortnight or three weeks before the commencement of the lambing season. There is almost invariably a history of high condition, or at least good condition, in autumn, followed by a fall in condition during the winter. Its appearance frequently coincides with the commencement of hand feeding or with a snowstorm. Ewes carrying twin lambs are those generally affected, but in severe outbreaks ewes carrying single lambs may also succumb. Where sheep of different breeds or different ages are kept the disease is quite frequently confined to one age group or to one breed. It is encountered less frequently in sheep on arable crops than in grass flocks.

The symptoms are characteristic. The ewe, when first observed, stands in a normal posture, but when approached, even by a dog, it either refuses to move, takes a half turn or walks a few paces and stops. There is sometimes a high action. It does not appear to be severely ill, but stupefied. At this stage it is partially or wholly blind but it is not easy to convince the owner or oneself of this. This stage may last hours or days before the animal lies down and refuses to rise. Death may occur in four to ten days, but if the sheep lambs normally before the condition has advanced too far recovery ensues. Many of these cases, however, die from parturition sequelae.

Post-mortem examination is not of great assistance, the most notable change being fatty degeneration of the liver. The frequency with which one is asked to examine putrefied carcases makes this a poor criterion. Further, laboratory examination is of value from an investigational standpoint only, as, although various biochemical abnormalities have been recorded it is not known how many of these are characteristic of the disease.

Braxy-like Diseases of Adult Sheep caused by *Cl. welchii*

The conditions under which a high rate of mortality from these diseases are encountered do not obtain in many farms in the south-west. They are met with from January to May in flocks grazing on rich permanent pasture or in flocks which are moved from areas of rough grazing on to cultivated land in the spring. Low rates of mortality do occur in the spring in many parts of the south-west, most commonly in the small breeds. Few, if any, of these cases have been subjected to a sufficiently detailed examination to determine their exact nature. They are characterised by the animal's good condition at the time of death, a brief period of illness (symptoms being frequently overlooked) and rapid putrefaction. Little can be said about their pathology and bacteriology until an opportunity presents itself to examine carcases and to search for specific toxins in the intestinal contents, but from experience in other parts of England it is probable that they are entero-toxaemias caused by the C or D type of *Cl. welchii*.

Infectious Pneumonia

The sudden onset and alarming nature of outbreaks of this disease make it one upon which advice is frequently sought. It generally appears in the spring in grass flocks and it is usually found that the ewes are fed from boxes or racks. Sheep of all ages and all conditions are affected. Symptoms may be observed over a period of from 24 hours to six days and there are few recoveries. Clinical examination is a reliable means of diagnosis, the classical symptoms of pneumonia being well exhibited. Acute congestion or hepatisation and fibrinous pleurisy are discovered on *post-mortem* examination.

Milk Fever, Lactation Tetany or Lambing Sickness

The most dangerous pitfall in connection with this disease is to fail to suspect its nature and to mistake it for entero-toxaemia. It is not so closely related to parturition as in the cow and may occur several days before or several weeks after parturition. Tetany and staggering are usually observed and death may occur within a few hours if treatment is not applied. It is justifiable to inflate the udder even when the diagnosis is based on the most slender evidence, as the objections to this procedure in the case of the cow do not apply in the case of the ewe. Recovery occurs as rapidly as, if not more rapidly than, in the cow.

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Discussion

Mr. C. V. Watkins, who opened the discussion, said that most of the disease conditions of sheep referred to by Mr. Roberts were found in their area. He had not yet met cases of lactation tetany, however.

With regard to lamb dysentery, Mr. Roberts appeared to discount the value of *post-mortem* examination. It had been usual for him to find abnormally large clots of milk in the abomasum in such cases and the lambs concerned were usually from ewes in good condition and which were probably giving rather rich milk. Concerning the dispatch of specimens to a laboratory

for examination, he would like Mr. Roberts's views upon the use of saline solution to which 3 per. cent. chloroform had been added for preservative purposes.

Post-mortem examination of pulpy kidney disease cases often gave indefinite findings on account of the rapid onset of putrefaction, but typical kidney lesions might be found in fresh cases. More confirmation was certainly required apart from a pulpy kidney condition, which was really a *post-mortem* change.

He agreed as to the difficulty of diagnosing parasitic gastro-enteritis and cited the misleading information obtained by an isolated *post-mortem* examination of a yearling ewe from a flock affected with the disease. Trichostrongyle worm species were comparatively scanty and more or less confined to the abomasum. So-called Johne's disease was excluded, as, while the disease might cause similar symptoms, further bacteriological examination revealed the presence of a coliform type of bacteria in the blood and bile. The disease of the flock was later determined by the examination of numerous faecal samples which showed the presence of large numbers of worm eggs. Similar findings to those obtained by the above isolated *post-mortem* examination were possible in cases which had received no previous anthelmintic treatment. He thought a condition of pine, if it existed, would be very difficult to determine. A flock on the edge of Dartmoor was under investigation and biochemical examination of blood, bones and muscle was being carried out. So far, no deficiency of any minerals had been been determined. Parasitic gastro-enteritis had intervened and losses had definitely occurred from that disease.

With regard to pregnancy toxaemia he thought *post-mortem* discovery of fatty infiltration of the liver was of some value in diagnosing the condition. Did Mr. Roberts think biochemical examination of the blood, particularly the fluctuation of the fat content, might serve any purpose?

In connection with braxy-like diseases in the province, it seemed that sheep brought in from a wide range of poor pasture and turned on to more restricted richer pastures suffered most. Probably a high protein factor was operating through some digestive disturbance caused by the change. Farmers who had put sheep from moorland pasture on to their poorest ground had no losses.

Mr. E. W. Ascoli referred to sheep which were running on turnips and receiving oats and then were transferred to grass. Eight of seventy sheep died; some which were ill recovered. There was prostration and decubitus with nasal discharge and a twitching of the muscles. Sheep dying after three days of illness were examined *post-mortem* and showed enteritis and pneumonia. The sheep were removed from the field but a month later the farmer put them back in the same field and another ewe died, the same symptoms being seen. In another flock of 80 sheep, fourteen died during the winter months. Affected animals were usually found dead. *Post-mortem* examination of one which died an hour after chasing a dog away from her lamb, showed petechial haemorrhages in the small intestine.

Mr. Ascoli, concluding, asked what was the course of the disease in infectious pneumonia?

Mr. W. Tweed observed that when ewes affected with pregnancy disease were sent to the abattoir for slaughter, the owner often said they were stupid and ran into walls. Any ewe near to parturition usually had some fatty condition of the liver. With regard to Johne's disease, was it possible for sheep to obtain the infection from cattle? Sheep on farms where cattle were affected surely could not escape ingesting the organisms.

Was infectious pneumonia of sheep a pasteurella type of infection? Edington and he found a disease of cattle—a nodular type of pneumonia with areas of consolidation in different stages. The pulmonary septa contained fluid and gas. It was connected with bad hygienic conditions and the cause was a pasteurella.

Mr. K. Roberts referred to the death of nine lambs in a flock, adding that several others were butchered or they would have died. The fatal cases died in 36 hours. The sheep sat on their hind quarters. The butchered animals showed no evidence of fever, and there was no general dropsy, but around the kidneys the tissues appeared to be dropsical. Macroscopically the kidneys were normal. The Cambridge report stated that there was some nephritis and olighaemia, and he was asked if the sheep had any toxin in their food. Cake was withheld and the pasture was changed. Losses stopped as soon as the cake was discontinued.

Mr. E. B. D. Hall asked if the cause of pneumonia in sheep was the same as in catarrhal fever?

Mr. J. Dyson referred to sheep suffering from pneumonia which were dipped. Several were dead next day, and then there were no further losses.

Major Fyrth said that ewes were lambing now (October) in Dorset. They were fed from troughs (oats and cake) and were fat. There was very little lamb dysentery, but plenty of parasitic gastritis.

Mr. E. C. Bovett asked if it would be suggested with regard to protein feeding that a mare on white clover would kill her foal, and if the question of high protein blood content was well understood by laboratory workers?

Mr. W. Menzies, speaking in reference to pregnancy toxaemia, said that the liver might not be much changed. He asked if a high non-protein nitrogen content of the blood was diagnostic of the condition.

The Reply

Replying to the points raised in the discussion, Mr. Roberts said that blood changes had been found by various workers in pregnancy toxaemia, but it was a matter of opinion as to whether they could be used for diagnosis. Mr. Watkins had mentioned the protein theory in connection with the causation of braxy-like diseases. It had been suggested, but no one had been able to produce these diseases by feeding experiments or by giving cultures.

Lamb dysentery was most commonly found in lambs on good milking ewes. The milk of hill ewes was better than that from the lowland sheep, and the disease was commoner in the

former. When there was an increase in the nutritive qualities of the diet in the spring there were outbreaks of pulpy kidney disease.

The point was, was it the protein or a deficiency before-hand? The trouble might come through the milk or by nibbling at grass. Some change took place in the alimentary canal which let the anaerobes multiply and kill the lambs. Braxy and entero-toxaemia occurred when the grass was rich in protein, but it might not be the protein: it might be the increase in diet, due to movement from poor land to good.

Pulpy kidney of suckling lambs was not common on arable land. When lambed when there was good food there was no trouble. Dorset horns were fed very evenly and there was not a starvation diet at the time of lambing.

Concerning the value of *post-mortem* examinations in lamb dysentery, if one examined two or three lambs one would be unlucky if one found no ulceration, but a negative diagnosis must not be accepted when no ulceration was found. It was originally thought that it took several days for ulcers to form, but ulcers had been found in lambs four or five days old, and which had only been ill 24 hours.

Material from suspected braxy-like diseases should be sent to the laboratory as tied up specimens or in 3 per cent. chloroform. The bacteria could then be isolated at the laboratory.

The D factor was present in lamb dysentery and pulpy kidney disease. The C factor disintegrated very rapidly and might prevent distinction between lamb dysentery and pulpy kidney disease.

In reply to Mr. Roberts, the cases looked like pulpy kidney disease but the negative diagnosis from the laboratory would mean that the C factor had disappeared. The D factor might also disappear if the specimens arrived late.

He thought that there was fatty degeneration of the liver in pregnancy toxaemia, but he did not know if it was the cause or the result.

There might be a true pine on Dartmoor. It occurred over granite in Scotland and there was granite on Dartmoor. Parasites must be excluded first. Pine was met with in three or four limited areas in Scotland. In some areas it was easy to treat by putting sheep on other land. Iron would cure it and sheep could then remain on the land. No increase took place in the iron in the sheep: the curative effect might be due to some impurity in the iron.

As to Johne's disease in cattle and sheep, the causative organism was very different, and it was difficult to believe that the two conditions were the same. The organism was cultivated from the sheep only with difficulty, while the history was different and many sheep appeared to recover.

With regard to a pasteurella being the cause of infectious pneumonia in sheep, a pasteurella-like organism could be found, but it would not set up the disease in sheep. The outbreak might end suddenly: that might account for the fact that Mr. Dyson's cases ceased after dipping. The disease often occurred when sheep were brought together and trough fed in spring.

He was not clear as to Mr. Hall's question concerning catarrhal fever. The sheep might run at the nose, but he had not heard of actual catarrh in connection with infectious pneumonia of sheep.

In reply to Mr. Ascoli, the enteritis and pneumonia were suggestive of obscure alimentary disease. With regard to the 14 sheep which died and in which no toxin was discovered, it must be remembered that in entero-toxaemia of adult sheep there was often a factor which disintegrated quickly. As to dystokia, this sometimes occurred almost like an epidemic. Some flocks might lose 3 or 4 per cent. of the sheep at lambing, and other flocks adjoining might lose only 1½ to 2 per cent. It was often correlated with a bulky diet—hay or roots at lambing time. A serum (*B. chauvoei*) might help ewes which had been handled at lambing.

The course of infectious pneumonia was from two to seven or eight days.

ANNOTATION

Prontosil

FURTHER WORK ON THE CHEMOTHERAPY OF STREPTOCOCCAL INFECTIONS IN MAN

In a previous issue (*Vet. Rec.*, August 8th, 1936) we had occasion to refer to the discovery of a new therapeutic substance which appeared to exert a specific curative effect in acute streptococcal infections in man. At that time medical literature in this and other countries contained numerous reports on the efficacy of Prontosil in the treatment of such conditions as puerperal fever, erysipelas and other affections due to haemolytic streptococci. Particular attention was drawn to the work of Colebrook and his co-workers at Queen Charlotte's Hospital in which extremely favourable results were obtained from the use of the drug in cases of human puerperal fever. Two further papers have now appeared—a clinical report by Colebrook and Kenny,[1] which adds confirmation to their previous work, and a paper by Colebrook, Buttle and O'Meara[2] indicating the possible mode of action of prontosil.

In their most recent report Colebrook and Kenny deal with their experience in treating a further series of 26 cases of puerperal fever by oral and intramuscular administration of prontosil, and summarise the impressions gained to date. Every one of the 26 cases recovered, including six with septicaemia. Analysing the results in the previous and present series of cases of parturient fever, a total of 64 cases, the following facts emerge:—

(1) Of 64 cases treated by prontosil during 1936, there were only three deaths. In addition to these 64 cases, there were 21 cases also infected by haemolytic streptococci which were considered too mild to need special treatment.

(2) The death rate at Queen Charlotte's Hospital for all cases infected by haemolytic streptococci was 3·5 per cent. of 85 cases in 1936 as compared with 24·4 per cent. of 90 cases in 1935.

(3) The well-known tendency of puerperal infections to spread to the cellular tissues of the parametrium and the pelvic walls has been conspicuously absent in the 64 prontosil-treated cases.

Passing to the interpretation of the significant fall in death rate, the authors state that "it is difficult to resist the conclusion that the remarkable improvement in the clinical results has been chiefly due to the introduction of treatment with prontosil." Before accepting this conclusion the authors consider other probable explanations of the decline in mortality rate. These are two in number, *viz*: (1) the possibility that an unusually mild group of cases was being dealt with, (2) a sudden diminution of "virulence" (killing power) of the haemolytic streptococci for the human subject. After reviewing the evidence for the first possibility the authors conclude that "it seems unlikely that there has been such a change as to account for the very large reduction in the death rate." With regard to the second possibility, there is some evidence of a natural decline in the severity of the disease, and whilst the authors are prepared to admit this, they feel justified in concluding that the efficacy of prontosil has been clearly demonstrated.

The Mode of Action of Prontosil

The paper by Colebrook, Buttle and O'Meara is of considerable interest, in that it indicates the possible mode of action of prontosil in controlling infections by haemolytic streptococci in the mouse, and in producing the apparently analogous curative effects reported in man. *In vitro* tests carried out by these investigators have shown that *p-aminobenzenesulphonamide*, a substance closely related to prontosil, has a bacteriostatic and bactericidal action against small numbers of haemolytic streptococci in culture medium. Prontosil is unable to exert any similar effect *in vitro*, but it has been shown that the blood of man and animals, following medication with prontosil, can destroy haemolytic streptococci when applied to *in vitro* tests. From these experiments, it seems probable, therefore, that the bactericidal action which develops in the blood of prontosil-treated animals or patients is due to the presence of the sulphonamide, which is possibly produced from prontosil by the reduction of that substance in the body.

The significance of this work can hardly be over estimated. *The British Medical Journal*,[3] in a recent leading article states: "We believe this to be the first occasion on which any germicide has been proved capable of killing bacteria in blood in a concentration obtainable in the blood of a patient. If the obvious interpretation of these experiments is accepted the 40-year-old ideal of *therapia sterilisans magna*, so far from receding into the domain of medical mythology, has at one step taken its place as a concrete fact of daily practice." "Much remains to be done in discovering the capacity and limitations of these remedies," says a leading writer in the *Lancet*.[4] Nevertheless, "it has become an imperative duty to employ them not only in puerperal fever, but also in other severe forms of streptococcal infection."

The Veterinary Record
February 27th, 1937.

Streptococcus Infections in Animals

It has been said with some truth that, amongst humans, streptococci are responsible for more acute disease than any other group of bacteria. And in at least one of these conditions, puerperal fever, the mortality rate is high, and has remained so for many years despite all attempts to reduce it. The promising results obtained at Queen Charlotte's Hospital and at other places by therapeutic measures which form the basis of an annotation* in this week's issue will, it is hoped, be only the forerunner of further successes of a similar kind in both the medical and veterinary fields.

The diseases of animals associated with streptococci are less fatal in their effects but nevertheless responsible for much disease and considerable economic loss. We need only instance the common contagious mastitis of dairy cows, without doubt the most important of the streptococcus infections in animals and one of the most serious diseases with which the farmer has to contend, and, in equines, strangles and many cases of pneumonia and joint-ill, whilst streptococci are also at times cause for endometritis and abortion in mares and for a variety of pyogenic infections in most species.

The streptococci of animal diseases are, however, different from those of human infections. They belong to different species or groups. Thus, the streptococcus concerned in most acute human infections is *Str. pyogenes* (Streptococcus, Group A), that concerned in bovine mastitis is *Str. agalactiae* (Streptococcus, Group B) or, in the more acute forms, other

*"Prontosil: Further Work on the Chemotherapy of Streptococcal Infections in Man."

References

[1]Colebrook, L., and Kenny, M. (1936.) *Lancet*. 231. 1319-1322.
[2]Colebrook, L., Buttle, G. A. H., and O'Meara, R. A. Q., *Ibid*. 231. 1323-1326.
[3]*British Med. J.*, Jan. 9th, 1937. p. 79.
[4]*Lancet*. 231. p. 1339.

N. J. S.

groups of streptococci, whilst many of the other streptococcus infections in animals, *e.g.*, strangles, are associated with yet another of the broad groups of streptococci (Streptococcus, Group C). The importance of this lies in the fact that the recently introduced therapeutic agents—"Prontosil" and "Sulphonamide"—have so far been shown to be active against *Str. pyogenes* only and are not active against certain other streptococci. Their full range of action is still unknown. There is, therefore, no reason at the moment to look for success from their use in streptococcus infections in animals. Bovine mastitis is, however, on rare occasions caused by *Str. pyogenes*, implanted in the udder from a human source, and presumably this is the only case in which a specific effect of "Prontosil" or "Sulphonamide" would be expected. Moreover, given a substance which had a like effect on *Str. agalactiae*, there are two other points of importance in connection with the use of such substances: firstly, oral administration (one of the great assets of "Sulphonamide" and "Prontosil") would only be possible if it were excreted in bactericidal concentration in the milk; secondly, a further point of importance is the fact that "Sulphonamide" is only capable of dealing with small numbers of streptococci in the blood whereas in the udder the numbers are usually relatively large.

Much work has been done in recent years on the practicability of sterilising udder infections with streptococci by the injection of various bactericidal substances *via* the teat canal. Of these, the acridine derivatives stand first. "Entozon" is now widely used and is generally accepted as one of the best agents, although good results have also been obtained with acriflavine. Both of these substances, however, cause some irritation of the mucous membrane of the mammary gland and neither is as efficient as we would desire. It may be said that until some 70 to 80 per cent. of successful results can be obtained with a single injection, treatment by chemotherapy *via* the teat canal will always have a limited application on ground of cost, though there is no doubt that its use is to be recommended in young or valuable animals.

Attempts have also been made, both in the medical and veterinary fields, to raise the resistance of the individual to streptococcus infections. In *Str. pyogenes* infections of humans the use of a toxoid prepared from the erythrogenic or rash-producing toxin has been followed by good results. The streptococci from animal diseases, however, produce no toxin like that of *Str. pyogenes*, and the toxoid method cannot therefore be applied to animal diseases. Moreover, the success which has followed the use of *Str. pyogenes* toxoid in humans has been in a reduction of the effects of the toxin produced by that species, *e.g.*, the scarlet-fever rash, and, as would be expected, not in a reduction of other sequelae, those resulting from its invasiveness. That is to say, the effects are those of an antitoxic and not an antibacterial immunity. Between these we must make a clear distinction. The ordinary vaccines, autogenous or other, which contain little or no toxin or toxoid, have given disappointing results both in human and animal streptococcus infections, and though we may hope that with more knowledge of the streptococcus and its mode of action progress will be made in this direction, we have at the moment to regard streptococcus vaccines as relative failures.

Fortunately, however, in the control of streptococcus infections in animals, we have another line of attack not open to the medical profession. Whereas they have usually no control over the normal carrier of streptococci, or indeed of abnormal carriers of dangerous streptococci unless they are suffering from a notifiable disease such as scarlet fever, we have a considerable measure of control over animals and can, therefore, prevent the contact of infected and uninfected animals, or, at any rate, take the measures essential to prevent the spread of infection. Such a procedure is frequently made use of and is the basis of a method of controlling streptococcus mastitis in the bovine which has been proved successful. There are, it is true, many practical difficulties to be faced in such attempts to control streptococcus and other diseases but, with increasing knowledge, we should make it our aim to use to the full our power to control the animal and thereby to prevent the spread of infection to the healthy, *i.e.*, in general the younger members of a species, and to restrict the use of vaccines to those diseases in which they have been proved of value experimentally, or in which hygienic barriers are clearly impossible.

Work will shortly be begun on the new headquarters of the Pharmaceutical Society in Brunswick Square. They are estimated to cost £195,000. Largely as a consequence of the rising cost of labour and materials, the council of the Society have decided that the building scheme should be expedited.

CLINICAL COMMUNICATIONS

Toxaemia in the Cat

HAMILTON KIRK, M.R.C.V.S.

A two-months-old long-haired kitten was admitted for treatment of a discharging abdominal sinus occurring as a sequel to an oöphorectomy performed by another practitioner. Progress had been made at the end of several days, and then the kitten became very quiet and dejected, and there was anorexia and slight fever. Resentment at being stroked prompted a closer examination of the back and an abscess was found between the shoulder blades. This was promptly opened and a surprising quantity of odorous, creamy pus was released. The abscess cavity appeared to extend downwards behind the left scapula. Twenty-four hours later another abscess was evident over the last left rib, and this was also evacuated. Instead of the improvement which I expected, the cat gradually became more prostrate, temperature rose, food was entirely refused, and I was rather at a loss to account for such symptoms. Despite frequent and careful cleansing of the wounds, the cat became worse and eventually reached that condition which to most veterinary surgeons would indicate imminent death. The short, weak, plaintive cry; prostration; inelasticity of the skin; a temperature of 105·5°; protrusion of the haws, and the semi-closure or squint of the eyes, all combined to prove the serious nature of the case.

Deciding that the condition was one of acute toxaemia, I resolved to try one of Bayer's human preparations in the treatment. Prontosil is described by its makers as the disodium salt of 4-sulphonamido-phenylazo-7-acetylamido-1-oxy-naphthalene-3, 6 Disulphonic acid in 2·5 per cent. solution, its chief indication being against puerperal sepsis, but also against toxaemia of other kinds. I injected 1·5 c.c. intramuscularly. In three hours the temperature was taken and found to have dropped two degrees. The cat seemed definitely brighter and was even cleaning itself. At the fourth hour it passed vermilion-coloured urine which at first was alarming until I remembered that prontosil contains a similar dye. Improvement continued and in twelve hours the cat fed voluntarily. Another similar dose was injected next day, following which there was a further decrease of temperature to 102°. Recovery, which at first was so doubtful, eventually occurred after further treatment, and one might feel justified in believing that the prontosil was the curative agent. I know, of course, that it is foolish to rush into print with one case, or to draw definite deductions from it; but here seems to be a promising remedy, not only for puerperal sepsis, but for septicaemias and toxaemias of all kinds. I hope in course of time to be able to report results of the use of this agent in other appropriate conditions as they arise.

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Yew Poisoning in Cattle

J. W. HALL MASHETER, M.R.C.V.S.
Newnham-on-Severn

During the stormy wintry weather of Friday night, January 29th, 1937, a bunch of 19 young shorthorn heifers of killing age (18 months and upwards) broke through the field fence into a wood, which contained a considerable quantity of the common yew, *Taxus baccata*. Being missed on the Saturday morning, a search was made and they were found in the wood actually eating the yew from one of the trees; two were lying dead under the tree. It is not, of course, known how long they had been in the wood, but it must have been anything up to 21 hours as they were found about 3 p.m. (They were seen at 6 p.m. on the Friday). They were driven back to their own ground and two more "dropped dead" on the way. They were put into a shed and three more died about 5 p.m.

The shed being wet and dirty, and the remainder of the cattle looking quite well, I had them moved on the Sunday morning to better quarters about 200 yards away. During the movement three more "dropped in their tracks." (I cannot describe it better; knees and hocks doubled up and they were dead before they reached the ground.) This was about 11 a.m.

After the movement two more appeared to be distressed, violently shivering about the shoulder muscles. Both fell several times but regained their feet each time. Incoördination of movement both "fore and aft" was very marked. I expected these two to die, but at my next visit (February 1st, 1937) they appeared to be quite recovered, eating, drinking, chewing the cud and defaecating normally.

The remaining seven did not seem to be at all affected.

Treatment, if it could be called treatment, consisted of a purge and a few doses of sodii bicarb. Why I gave the latter I do not know except that I saw in Lander, 1912, that "this had been given by McPhail 37 years ago."

Having a little more time and a more "collected recollection," I looked up J. A. Nicholson in the Third Report of the Director of the Institute of Animal Pathology, 1932-33. My stock of adrenalin being exhausted, as it naturally would be when it was particularly wanted, I sent for a further supply and also lobeline and barium chloride. Before these reached me, however, all the affected heifers

(Concluded at foot of next column.)

ABSTRACTS

[**Fowl Paralysis. I.—The Results of an Investigation into Thirty-eight Outbreaks.** Blakemore, F. **II.—Experiments on Transmission.** Blakemore, F., and Glover, R. E. Rept. Direct. Inst. Anim. Path., Camb. (1934-35.) 39-64.]

I.—After careful observations on 38 outbreaks of fowl paralysis, Blakemore came to the conclusion that dietetic errors alone were not responsible and that there is no evidence that modern methods of poultry husbandry predispose fowls to the disease. The incidence in individual outbreaks varied within wide limits—from 0·5 per cent. to 75 per cent. The symptoms and lesions encountered were similar to those described by other authors; it was also noticed that in healthy birds examined for the purpose of comparison, small infiltrations of lymphoid cells were frequently present in various organs, especially in the periportal tissue of the liver. Macroscopic tumours were observed in 40 per cent. of the outbreaks.

Haematological examination, complement fixation and precipitin tests and the mercuric chloride modification of the formol gel tests were all found to give negative or unreliable results.

The association of internal parasites with the disease was investigated, but there was no evidence of a higher incidence of parasitism in fowls affcted with paralysis.

In 15 outbreaks there was evidence that the disease had been transmitted by the egg. In several cases it was thought that the disease might have been introduced by cockerels which remained healthy. There was some evidence that the disease might be contagious.

II.—The experimental transmission of the disease was attempted. A large number of three-month-old chickens and of young chicks was inoculated with suspensions of various organs and tissues from affected birds. In the older chickens, 18 per cent. of the inoculated birds developed lesions; in the young chicks 15 per cent. became affected. Attempts to transmit the disease to a second series of birds were unsuccessful except in one case.

The feeding of infected tissues to very young chicks failed to set up the disease.

The transmission of the condition through the egg was demonstrated in an experiment in which eggs were removed from an affected flock, hatched and reared on clean ground; 57 per cent. of the chicks later developed fowl paralysis.

In the course of these experiments it was noted that intestinal parasitism apparently did not reduce the resistance of fowls to fowl paralysis.

C. A. McG.

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[**A New Method of Treating Contraction of the Hoof.** (Trans. title.) Houzé. *Rec. Méd. vét.* **12.** 5. 271-273]

The method consists of making a deep groove in the mid-line of the anterior surface of the hoof, 2½ cm. (1 in.) wide but widening to 3½ cm. (1½ in.) at the top. (*See* diagram.)

A shoe with a slightly rolled toe with no clips is then applied. Visible improvement may be expected in a fortnight.

E. W. A.

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[**The Influence of Cold Water Ingested Rapidly or in Excess, upon the Production and Prognosis of Acute Inguinal Herniae.** (Trans. title.) Cocu, M. *Bull. Acad. vét. France.* **9.** 8. 435-437.]

Two cases of acute strangulated inguinal hernia in the horse are described. In each case, surgical measures were carried out for the relief of the condition. Nevertheless, the pains did not disappear and both animals died within twelve hours of the operation. On autopsy, in neither case was there evidence of damage to the bowel involved in the hernia, or peritonitis. The stomachs and bowels were distended with water to an extreme extent, and in the duodena the fluid was slightly blood-stained.

It is suggested that excessive or rapid water intake may cause inguinal hernia and also injury to the intestine, and death.

E. W. A.

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[**Troubles due to the Ingestion of Cold Water by Cattle.** (Trans. title.) Moutaux. (1936.) *Rec. Méd. vét.* **112.** 11. 658-659.]

(1) Temporary atony and tympany of the rumen.

(2) Generalised vasomotor disturbances—dyspnoea, congested mucous membranes, inappetence, low skin temperature, often haematuria. These symptoms last for three days, recovery then taking place.

(3) Localised vasomotor disturbances:—

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were dead, and the others appearing to be quite well, I reserved the drugs for a further possible occasion.

In any case I do not think any treatment would have been of the slightest use, as the ten which died had got the lethal dose and I should think a good deal more.

(*a*) Cerebral congestion and haemorrhage—a single case. The following symptoms were observed in a two-year-old heifer immediately after the ingestion of cold water: Total loss of muscular co-ordination, stertorous respirations, loss of consciousness, coma interrupted by convulsions. Complete recovery took several months.

(*b*) Pulmonary congestion and haemorrhage—rapid, difficult breathing, coughing, serous discharge, and (in one case) fatal pulmonary haemorrhage. E. W. A.

* * * * *

[**A Note on the Cyanogenetic Glucoside in Linseed Cake.** (Trans. title.) Cazaban, F., and Isnard, J. *Rec. Méd. vét.* **112.** 4. 214-217. (17 refs.)]

Boiling decomposes the enzyme linase in linseed cake, but nevertheless the authors observed that hydrocyanic acid was produced after two minutes' boiling, and that at the end of four hours the amount liberated in one experiment was 0·054 per cent. The acid was detected by sodium picrate papers. After standing in the cold for 24 hours it could no longer be found.

Apparently water at 100° C. causes hydrolysis of the glucoside.

E. W. A.

* * * * *

[**Metabolic Disorders in the Sow.** (Trans. title.) Forestier, A. *Rec. Méd. vét.* **112.** 11. 660-662.]

The author agrees with MacLaughlan and Pollock (*Vet. Rec.*, 10.3.'34 and 6.4.'35 respectively) that milk fever (hypocalcaemia) occurs in the sow.

He describes three cases resembling in their symptoms and time of occurrence, milk fever in the cow. Treatment by the intravenous injection of a solution of calcium and magnesium chloride and glucose was followed by recovery in a few hours. An untreated case died.

All occurred on the same premises, in a period of five months during which the sows were fed on restaurant offal only.

E. W. A.

H.M. STATIONERY OFFICE PUBLICATION

The undermentioned has been published recently. Copies can be purchased through any bookseller, or directly from H.M. Stationery Office, at the following addresses: London: Adastral House, Kingsway, W.C.2, and 28, Abingdon Street, S.W.1; Cardiff: 1, St. Andrew's Crescent; Manchester: York Street; Edinburgh: 120, George Street.

	Price Net. s.	d.	*Post Free.* s.	d.
House of Commons Papers (Session 1935-36.)				
148. Development Commissioners. 26th Report for the year ended March 31st, 1936	3	0	3	3

REVIEW

[**The Internal Parasites and Parasitic Diseases of Sheep, their Treatment and Control.** Ross, I. Clunies, and Gordon, H. M. (1936.)]

Helminth parasites are considered to be the most important source of disease and economic loss to the sheep industry in Australia, and the authors have produced this book because they felt there to be a requirement for a specialised treatise on the parasitic worms and parasitic diseases of sheep for the use of sheep farmers and of workers on sheep diseases.

The parasites and diseases of Australian sheep receive the fullest attention, but parasites which have not as yet been located in Australia are also included and the book represents a fairly complete account of the helminthology of the sheep.

The sections on fascioliasis, parasitic gastritis and nodular disease receive particularly careful treatment and there is much interesting information on the diagnosis, epidemiology and pathology of parasitic gastritis in its association with the several species of trichostrongyloid worms causing the disease. Most, although not all, of the observations recorded in this section appear to tally well with our experiences in this country: the association of diarrhoea with trichostrongylosis and not with haemonchosis is the reverse of our experience. One questionable statement which appears elsewhere is that the nodular worm *Oesophagostomum columbianum* occurs in this country; although this may have been reported at some time there seems to be no reliable record of its occurrence here.

Although the book is primarily written for the scientific worker great care has been taken to present the information in such a way that the layman will be able to derive the greatest possible benefit from its perusal and a glossary of scientific terms is appended to help him in some of the special terminology which must necessarily be used in writing such a book. Notes are also given on the collection, preservation and examination of parasites and the diagnosis of parasitic disease.

The text is clearly written and well illustrated by many original and well-chosen photographs and drawings and can be thoroughly recommended to all who are interested in the subject.

THE KING'S RACING MANAGER

The appointment is announced of Captain Charles Moore to be manager of the King's Stud and horses in training in succession to the late Brigadier H. A. Tomkinson.

Captain Moore has been for many years a member of the Irish Turf Club and was elected a member of the Jockey Club some time ago.

Professor Sir Frederick Hobday

Portrait Presentation Ceremony

Tributes to his Worth and Work

A very large company, including a number of distinguished figures in social, professional, and public life, assembled at the Connaught Rooms, Great Queen Street, London, W.C.1, on the afternoon of Thursday, February 18th, 1937, on the occasion of the presentation to Professor Sir Frederick Hobday, *C.M.G.*, F.R.C.V.S., F.R.S.E., DR. MED. VET. (*H.C.*) (ZUR.), of his portrait in oils, executed by Mr. John Hassall, R.I.

The presentation was made, on behalf of the subscribers to the portrait fund, by the Duke of Portland—Senior Governor of the Royal Veterinary College during Sir Frederick's régime as Principal and Dean—and the Duchess of Portland, and was the outcome of a movement to give to Sir Frederick some tangible expression of both the esteem in which he is held as a veterinary surgeon of world-wide eminence and the universal appreciation of his efforts, as Principal of the Royal Veterinary College, to make that school the premier veterinary teaching institution of the British Empire.

It was an impressive and successful ceremony, in which the central figure must have found many causes for gratification. Foremost amongst them, doubtless, was the knowledge that the subscription list was representative of a host of friends and admirers, so many of whom had taken the further opportunity of attendance at this function to pay personal tribute to his popularity, his worth and his work.

His Grace the Duke of Portland, K.C. (in the chair), and Her Grace the Duchess of Portland, were accompanied on the platform by Professor Sir Frederick Hobday, Lady Hobday and Captain Scott Dunn.

Captain H. S. A. Dunn, having on behalf of the company present, extended a welcome to the Duke and Duchess of Portland, announced that the Duke had been kind enough to say that he would take the chair at those proceedings.

The Duke of Portland expressed his appreciation of the opportunity which had been afforded him of presiding on that occasion—an opportunity of which he availed himself most willingly. His wife and he were very glad indeed to be there; for his part, he felt it a great honour that he had been invited to present, on their behalf and on behalf of the subscribers, that portrait (which was shortly to be unveiled) to their old colleague and friend, Sir Frederick Hobday.

He very much hoped that Sir Frederick Hobday would allow him to include both his wife and himself among the many friends present there that day. There were many times when Sir Frederick had not only shown his personal friendship to them in the kindness and geniality of his manner, but on several occasions their horses and their dogs had received great benefit from his sympathetic care and very skilful treatment, and he need hardly say that those lucky animals—because they were very lucky to come under Sir Frederick's care—benefited very much from their experience.

On such an occasion as that, as he knew they

would all agree, he thought it was more than pardonable if he ventured to mention some of the leading events of Sir Frederick's extremely distinguished career. He qualified as a veterinary surgeon in May, 1892, and since then he and his work had become renowned throughout the whole world. His merit had been gratefully recognised by his having been created a Companion of the High Order of St. Michael and St. George; he had also been created a Fellow of the Royal Society of Edinburgh, a Doctor of Veterinary Medicine of the University of Zürich, and Honorary Veterinary Surgeon to His Majesty the King. During the War he rendered skilful and most useful service on both French and Italian fronts, no doubt exposing himself to great danger in the service of the animals which he relieved of their suffering so far as he could. In consequence of this skilful service, he received honours from both the Governments of those countries. To mention but one of Sir Frederick's well-known achievements in the practice of the veterinary art, he would instance his discovery of a treatment by operation on the throat of the horse for the complaint which to lay people—he did not know whether to people who were educated in the veterinary art—was commonly known as "roaring." The word "roarer," he took it, was, so to speak, an all-round definition of a horse which was not quite sound in its wind and which, in consequence, made what was to the rider a very disagreeable noise. If it could not be claimed that the operation was uniformly successful—and of what operation could it be so claimed?—there was very good reason to believe that if that operation was performed soon enough it was more likely than not to effect a cure. A short time ago, he asked a very old friend of his, a Newmarket trainer, whether he believed in this treatment, receiving the reply, "By all means, if it is done in time." The trainer gave him an instance of a two-year-old under his care which seemed to be quite useless for racing on account of that infirmity. However, he had it what he termed "Hobdayed," and that roarer which had seemed useless as a two-year-old became at three or four years old the winner of from four to five thousand pounds in stakes and, more wonderful still, was subsequently sold as a sound animal. He thought that spoke a great deal for the efficiency of that operation. (Hear, hear.) If time permitted he would be able to quote to them many other instances in which that operation had been successful, but he thought—and he hoped his hearers would do also—that the one instance which he had quoted was sufficient to show the great value of Sir Frederick Hobday's work as a surgeon. (Applause.)

It was, however (proceeded the Duke), as recently as 1927 that Sir Frederick began to make the greatest effort of his life: he referred to the rebuilding of the Royal Veterinary College. (Applause.) He ventured to say, and he was confident that all his hearers would agree with him, that no other man would have dared even to undertake such a task, and he believed that no other man could have succeeded as Sir Frederick had succeeded. (Hear, hear.) The College, now happily very nearly completed, was indeed a noble building, built to help on a most noble purpose, and he believed that it would be second to none in the world. (Applause.) He was extremely glad to think that just as that portrait, which he was to have the honour of unveiling, was a memento of their personal affection and admiration for Sir Frederick, so the new building to which he had alluded would be a public and lasting memorial to one of the most remarkable and skilful men the veterinary profession had ever numbered amongst its members. (Applause.)

Sir Frederick, however, was not only a notable public figure; he was also a popular and beloved individual. He had, he was bound to have, a multitude of personal friends who looked upon him not only with respect but with affection. (Hear, hear.)

About a year ago, Mrs. Scott Dunn, the wife of one of Sir Frederick's colleagues, had the very happy inspiration that Sir Frederick should receive a visible token of the honour and affection felt for him by all his professional brethren. That idea, of course, met with very general approval, and an influential committee, consisting of Captain Scott Dunn, Major Kirk and Professors McCunn and Miller, was appointed, and soon the project took practical form. That day, when he unveiled the portrait, they would see the result of the committee's efforts in the fine painting executed by Mr. John Hassall.

In asking Sir Frederick kindly to accept that picture he considered, and he believed rightly, that they were not only recognising the eminent services of a very distinguished man, but at the same time that they were doing honour to themselves; not only offering honour to themselves, but also to the veterinary profession, in which Sir Frederick had for so long been a distinguished figure.

With those few, quite inadequate, words, he would ask Sir Frederick in due course, after it had been unveiled, to accept the portrait and at the same time he trusted that Sir Frederick would realise, as he was sure he would do, that it conveyed with it the respect, goodwill, and the affection of all his numerous friends.

(The portrait, which is life size and represents Sir Frederick Hobday in Court dress with animals appropriately portrayed in the background, was now unveiled amid loud and prolonged applause.)

Sir Frederick Hobday, acknowledging the

presentation, said that words quite failed him when he tried to express his gratitude to those present for their kindness and courtesy in coming there that afternoon to do him such great honour—which honour was not an honour to him only, but to his profession. Little did he realise when, as a schoolboy, he decided to live his life amongst sick animals that a day like that would ever come; far less did he ever dream that if his portrait was painted the ceremony of presentation would be carried out by such well-known lovers of animals as Her Grace the Duchess of Portland and the Duke; he was especially proud that this was the case because they were Midland people and he himself was a Midland man. His Grace had been very kind in all that he had said; he had given him credit for much more than he deserved. ("No, no.") When he looked round on that assembly that day he felt that he did indeed know what the words "true friendship" meant. ("Hear, hear.") That was the proudest day of his life and to think that so many of them had come so far—as many of them had done—to be present on that occasion gave him a very proud feeling indeed.

The work that the committee had done had been a laborious one. He knew from experience how very much trouble and time had to be given to an effort of that kind, even if things went well. His thanks were very sincerely given to Mrs. Scott Dunn for having so kindly thought of the idea of the portrait presentation, to Captain Scott Dunn, and to Major Kirk, Dr. McCunn and Professor Miller, for the energy and enthusiasm with which they had brought that assembly to such a success, as it undoubtedly was that day. Then he must express his most grateful thanks to his old friend Mr. John Hassall, whose patience he must have tried sorely on numerous occasions. Perhaps he (Sir Frederick) must be a man of moods, for Mr. Hassall had told him that at no two sittings did he look alike, and so Mr. Hassall had to work under circumstances of considerable difficulty. With what success he had carried out his task he would leave it to them to judge. (Applause.)

Concluding, Sir Frederick, speaking with emotion, said that there was one other person to whom he wished to refer: he knew that they would all be pleased to see his wife there that day. (Loud applause.) None of them ever expected to see her out and about in that way again, and all his hearers would be very glad to know that she had made an excellent recovery. (Applause.) On such an occasion as that he might be permitted to express the view that a man's life was made by his wife, and to this rule his own life had been no exception.

At the conclusion of Sir Frederick's speech the assembled company rose and enthusiastically accorded musical honours and cheers to both Sir Frederick and Lady Hobday.

Mr. John Hassall, R.I., in the course of a witty response to the invitation to address the assembly extended to him from the chair, said that he quite expected to have to make some apologies. (Laughter.) That expectation had arisen from the fact that the portrait was originally intended to be done in the Cubist style. It was going along splendidly on those lines till he came to the medals, and one could not make a medal with a lot of triangles, and so the portrait was altered: it was doubtless to that which Sir Frederick was referring when he had touched upon the subject of patience. Eventually Sir Frederick had to grow a moustache to look like the portrait. (Loud laughter.) When Sir Frederick looked at the animals in the background—there were a sheep, a pig and a cow—he said "But, of course, my chief object in life is the horse," to which he (Mr. Hassall) had replied, "Well, you are standing in front of it"—(laughter)—and so horses had to be developed as cloud effects in the background. Mr. Hassall added that he had originally intended to have as a background the old and the new College buildings, but as the former had disappeared and the latter were not yet available for his purpose, he had to use the background they now saw. (Laughter.)

Captain Scott Dunn thanked Sir Frederick for the extremely kind observations he had made regarding his wife and himself: anything they had done in connection with that afternoon's presentation had been a very real pleasure to them. He desired to add his personal thanks to the subscribers who had made that event possible; also to his fellow committeemen, Professors McCunn and Miller, and last, but by no means least, to Major Kirk, who had officiated so ably and indefatigably as their Secretary and Treasurer. Major Kirk was known to all of them, and whatever he took up he did very well indeed: nothing was too much trouble, and he would like to thank him on behalf of the committee for the most excellent work he had done.

Major Hamilton Kirk, in acknowledgment, said that he had had an excellent committee to work with and the great advantage that he had not experienced the slightest difficulty in getting people to subscribe to that fund. It was really wonderful how subscriptions had come in, even from the ends of the earth. He had organised funds in the past, but he had never before had the experience of receiving letters saying what a delight it was to the writers to give money away. That, however, was no matter for surprise when one considered the character and quality of the man for whom that tribute was raised.

Major Kirk then read a list of apologies for

absence. All those letters, proceeded Major Kirk, were to be given to Sir Frederick as a souvenir which he knew he would treasure, together with the book in which, it was hoped, all the guests present had signed their names. Thanks were due to Mrs. Scott Dunn for the thought which had resulted in the formation of the committee and the subsequent presentation. What little he himself had done had given him great pleasure to do, as he was proud to regard Sir Frederick as his sincerest friend.

He could not conclude without conveying the thanks of the committee to the artist, Mr. John Hassall, because he was sure that he had portrayed Sir Frederick faithfully in every detail. He also wished to make reference to the great pleasure they all felt in seeing Lady Hobday back in health again amongst them. (Applause.)

Professor McCunn, in thanking the Duke and Duchess of Portland on behalf of the subscribers, for their participation in that ceremony, said that his duty afforded him the greater pleasure because his master, Sir Frederick Hobday, had been honoured, and also because the people from Welbeck, the Duke and Duchess of Portland, whom he had known since he was a small child, had come along to honour Sir Frederick. The admiration and respect which he had always felt for them had grown with the years. To his mind they represented an ideal of public life which was such as to make English people proud. Their action that day was only a small token of the wealth of kindness which was situated at Welbeck. The Duke had been known to refer to his Lady as the queen of his heart and he, Dr. McCunn could tell everyone that to the people of the Midlands—and there was a large number present that afternoon—they were the king and queen of their hearts.

Before he asked those present to accord that vote of thanks, he would request Her Grace to accept a token of their appreciation from the hands of Miss Jean Scott Dunn. He knew that bouquet (of carnations) was composed of her favourite flower and it was decorated by the most famous racing colours this world had ever known.

The Duke rose to speak, but found his voice practically gone, so, turning to the Duchess, he was heard to exclaim: "I must ask my wife to respond, for I have become a 'roarer.'" (Laughter.)

The Duchess of Portland, expressing the pleasure which her attendance at that ceremony had given her, said that she had known Sir Frederick for a very long time and always regarded him as a great friend. The Duke had put into his own words exactly what was in her own mind in regard to Sir Frederick Hobday, and she did hope that Sir Frederick would live long to carry on his wonderful work amongst suffering animals. She felt, too, under a deep debt of gratitude to Dr. McCunn, whose friendship, skill and advice had always been highly valued at Welbeck.

REPORTS

Tanganyika Territory

REPORT OF THE DEPARTMENT OF VETERINARY SCIENCE AND ANIMAL INDUSTRY, 1935

The policy of the Department has five principal immediate aims, namely, the control of infectious diseases, particularly rinderpest and pleuro-pneumonia; the development of the industrial side of animal products, such as butter, hides and skins; improvement of grazing and better distribution of animals (soil erosion is a serious menace in parts of the Territory); research and native education in the interests of livestock improvement.

The major diseases are rinderpest, bovine pleuro-pneumonia, East Coast fever and trypanosomiasis. Rinderpest is controlled by quarantine and serum-simultaneous immunisation of infected herds. Goat virus instead of bovine virus was used during the year with satisfactory immunising results and with the added advantage that bovine piroplasms and certain trypanosomes were eliminated from the inoculum. The blood of the goats was found suitable between the fourth and ninth day after infection. One goat bleeding gave sufficient virus for 500 to 800 cattle. Contagious bovine pleuro-pneumonia was dealt with by quarantine and vaccination with culture vaccine; an interesting account of the effects of the latter is given. East Coast fever is enzootic in the highland grass areas; its reduction is difficult under existing conditions but dipping has been employed as extensively as facilities allowed. Trypanosomiasis is a serious problem since over two-thirds of the Territory is infested with tsetse flies. *T. congolense* and *T. vivax* are the two chief pathogenic species. *T. brucei* and *T. theileri*, although frequently harboured by animals (bovines presumably), seldom cause ill-effects. Reclamation of infested areas is being adopted with the purpose of reducing the fly belts but in some districts these belts are extending. Other diseases encountered were: anthrax, blackquarter, tuberculosis, contagious abortion, foot-and-mouth disease, redwater, anaplasmosis, heartwater, cow pox, mange and other skin diseases, helminthiasis, contagious pleuro-pneumonia of goats, equine lymphangitis (both forms), horse sickness, fowl typhoid and fowl pox. This list of formidable diseases in an animal population of about 10,000,000

indicates the tremendous task which confronts the dozen odd of our colleagues in the Territory.

On the research side some excellent work has been carried out by the Director of the Department (Mr. Hornby) and the chemist (Mr. French). Detailed descriptions are given of *T. simiae* infection in pigs, the effects of nutrition on the course of animal trypanosomiasis and mineral metabolism in that disease. The chemist also gives detailed accounts of a blood survey of cattle in volcanic regions, the composition and nutritive values of various food stuffs, growth variations in native cattle and certain factors of importance to bacon production. The botanist (Mr. Staples) has been engaged in pasture research and contributes important detailed information on his experiments. After reading this section of the report the writer is of the opinion that the veterinary departments of other Colonies should be provided with a chemist and botanist. Such specialists working in collaboration with veterinary officers, as they do in Tanganyika, are more likely to produce benefit to the interests of livestock improvement than when employed in a general agricultural capacity as they are elsewhere.

This extensive (155 pages) and instructive report should be read by all our Colonial members.

W. K.

* * * * *

United Provinces, India

REPORT OF THE CIVIL VETERINARY DEPARTMENT FOR THE YEAR 1935-36 (T. J. EGAN)*

The veterinary staff of the Province consisted of one Director, three Superintendents, one Veterinary Investigation Officer and 223 subordinates.

Disease.—There was an increase in the mortality from epidemic diseases for which rinderpest was mainly responsible. Thirty-one cases of glanders were detected and destroyed. Progress was reported in the treatment of cases of *surra*, which is rather widely distributed. Inoculation against rinderpest with "tissue virus" was conducted on a large scale and the advantages of this method are pointed out. The mortality from haemorrhagic septicaemia was reduced and it is claimed this was due to the more extensive use of vaccine immunisation.

The Veterinary Investigation Officer was employed in the supervision of treatment for *surra* and in the manufacture of tissue vaccine against rinderpest at the Research Station, Lucknow. He conducted investigation work in several diseases including an obscure canine disease. This report was submitted to the Imperial Council of Agricultural Research. A severe outbreak of Doyle's disease in poultry occurred and a case of "Leishmania Tropica" was detected in a canine patient.

There were 150 veterinary hospitals and dispensaries and the number of cases treated showed a satisfactory increase. Work on tour continued to show an increase also and the number of castrations performed rose considerably.

Breeding Operations.—The number of stallions at the close of the year was 54 with ten donkey stallions in addition. It is stated that the progeny of the Government stallions continue to show improvement.

G. K. W.

*[Superintendent, Printing and Stationery, Allahabad, India. Price Rs. 1-12-0.]

TUBERCULOUS MENINGITIS OF BOVINE ORIGIN

"Despite the incontrovertible evidence of many observers that infection by the bovine tubercle bacillus can be virulent for human beings there is still some scepticism, particularly among farmers" states the *British Medical Journal* in a recent annotation. "A recent communication before the French Academy of Medicine* was concerned with an analysis of the type of organism present in 130 examples of tuberculous meningitis studied at the Trousseau Hospital between the years 1932 and 1936. Culture from the cerebro-spinal fluid on Loewenstein's medium was made in each case, and 121 cultures were of the human type and nine of the bovine type. Animal inoculation was used to confirm the cultural characteristics of these bovine cultures. This proportion is similar to that described in other countries, but an interesting point which came out in a further analysis of the case records was that of the nine children dying from their bovine infection all had been brought up in the country and eight were known to have been given raw cow's milk for the greater part of their lives. In the remaining case raw cow's milk had also been taken: the father was also stated to be suffering from pulmonary tuberculosis, which introduces an element of doubt. Of the 121 human cases only 10 per cent. came from the country, and there was clearly a human source of infection in most of the cases. It was pointed out in the discussion that fatal bovine infection in country districts might well reach a higher incidence than these figures suggest, despite the usual custom in France of boiling all milk. The figures here given are not large compared with those available in other countries, but the subject has been little studied in France from this aspect. The communication, however, serves to clinch the case against raw milk for children in any part of the world.

*Bull. Acad. Med. Paris, November 17th, 1936. p. 373.

* * * * *

Mr. W. Douglas Smith, who has resigned his position as Secretary of the International Horse Show at Olympia, has been appointed Secretary and Manager of the Richmond Royal Horse Show. He will take over the duties of Mr. C. Capel Smith, who will retire after the Coronation Royal Horse Show on June 10th, 11th and 12th. Mr. Capel Smith has officiated for 37 years.

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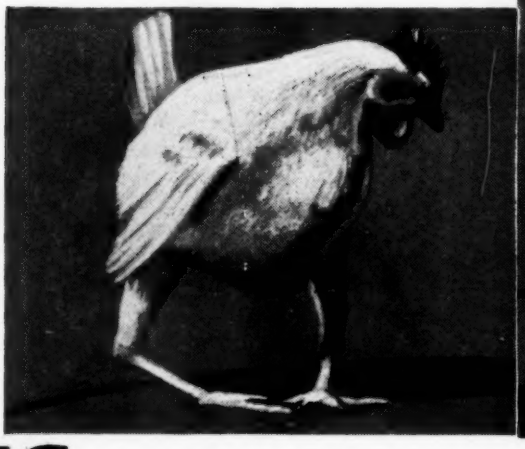

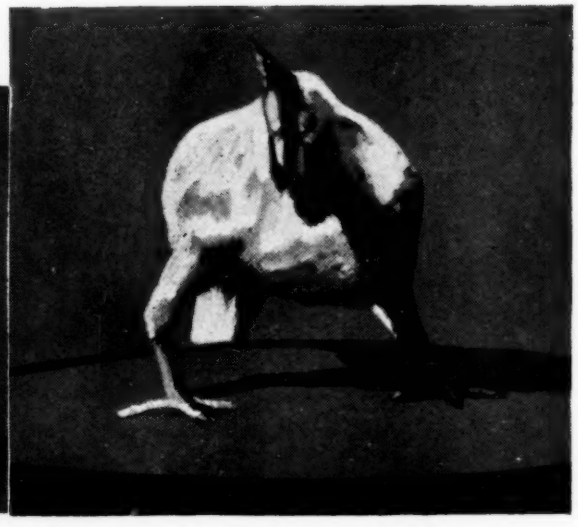

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N.V.M.A. DIVISIONAL REPORT

Western Counties V.M.A.*

MEETING AT TAUNTON

A meeting of the above Division was held at the Great Western Hotel, Taunton, on Wednesday, October 21st, 1936, at 2 p.m. The President, Mr. C. V. Watkins, M.R.C.V.S., D.V.S.M., occupied the Chair, and the following members signed the attendance book: Messrs. Watkins, L. W. Bovett, E. C. Bovett, W. Tweed, E. W. Ascoli, E. J. Thorburn, W. Menzies, E. B. D. Hall, Urquhart, W. Blackwell, Masson, K. Roberts, W. H. Chase, R. B. Nelder, A. G. Saunders, H. C. Wilkins, A. Mather, S. J. Motton and Majors Fyrth and W. H. James. Messrs. R. S. Roberts, S. Sharp and J. Dyson attended as visitors.

Apologies for absence were received from Messrs. F. T. and G. Harvey, Head, Brown, Willing, Perkins, Barbour, Macdonald, Forbes, Roach, E. R. Edwards, Fraser, Norman, R. G. Saunders, Kauntze, Crowhurst, Stephens and A. R. Smythe.

Election of Honorary Member.—It was unanimously decided to elect Mr. William Roach, of Exeter, an honorary members of the Association. Mr. Roach was one of the founders of the Society in 1884.

N.V.M.A. Congress, 1937.—Messrs. C. V. Watkins and W. H. Chase were unanimously elected to serve on the Provisional Committee of the N.V.M.A. for the Bournemouth Congress, 1937.

Clinical Case.—Mr. Masson described a case of intermittent lameness in a hunter. An X-ray photograph indicated a spur on the navicular bone, and this was confirmed at the *post-mortem* examination.

Address.—A much appreciated address was given by Mr. R. S. Roberts, F.R.C.V.S., Research Officer of the Agricultural Research Council, the subject being "Field and Laboratory Diagnosis of Disease in Sheep Flocks." [Mr. Roberts's address, a report of the discussion, and of his reply, are reproduced elsewhere in this issue.—*Editor.*]

Votes of Thanks.—At the end of the meeting the President proposed a very hearty vote of thanks to Mr. Roberts for his very excellent address, and this was carried with acclamation.

The meeting terminated with a vote of thanks to the President for conducting the meeting.

S. J. Motton, *Hon. Secretary.*

*Received for publication January 25th, 1937.

Eight of a herd of 35 two-year-old heifers belonging to Captain L. Edmunds, Cholderton Estate, near Bulford, have died of poisoning as a result of eating yew after straying on military ranges.

In Parliament

The following questions and answers have been recorded in the House of Commons recently:—

Heavy Horse-Breeding: Scotland

Major Neven-Spence asked the Secretary of State for Scotland whether a decision has yet been reached on the question of restoring the heavy horse-breeding grant for Scotland?

The Secretary of State for Scotland (Mr. Elliot): I have given careful consideration to the representations made to me on this subject; I have reached the conclusion that there is no sufficient justification at the present time for charging public funds with a general restoration of heavy horse-breeding grants in Scotland, but that it would be expedient to revive the special grants which were offered to societies in the islands of Orkney and in Argyll, which are part of the congested districts, to help to defray some of the additional expense incurred by these societies in obtaining high-class stallions from the mainland. I have, therefore, arranged that a limited amount of money will be provided for this purpose in the coming financial year.

Lieut.-Colonel Moore asked the Secretary of State for Scotland whether he will instruct his nominee on the Racecourse Betting Control Board to suggest that, in view of the increased surplus available in the totalisator fund and of the fact that part of the revenue of the Board is obtained from Scottish sources, part of the distributable surplus should be made available for the promotion of Scottish horse-breeding?

Mr. Elliot: The issue of such an instruction as is referred to by my hon. and gallant Friend is not within my powers. I am glad, however, to be able to inform him that the claims of the Scottish heavy horse-breeding industry for a grant from the surplus arising out of the operations of the Racecourse Betting Control Board in 1936 are at present engaging the attention of the Board, who are in correspondence with me on the subject.

Lieut.-Colonel Moore: Will my right hon. Friend point out to the Board how much appreciated by the horse-breeding industry in Scotland would be a satisfactory decision on this matter?

Mr. H. G. Williams: Do I understand that the Betting Control Board is distributing dividends before it has paid off its overdraft?

MEDICAL PROBLEMS AND PREMATURE PUBLICITY

The medical profession's dislike of premature publicity was referred to by Lord Dawson of Penn when he opened the new deep X-ray therapy radiological department at the Samaritan Free Hospital for Women, Marylebone Road. In the profession of medicine and surgery, he said, they discussed their problems and satisfied themselves that they were sufficiently advanced before they launched their views on the public. "We dislike within the profession anything like premature publicity, and hold it as a matter of honour that when we have something to tell to other people we tell it to our own colleagues in the first place, and not until after then is it open to the public." That action and restraint was, in the long run, for the good of the public. If it were not so the public would be constantly haunted by false hopes.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Mar. 1st.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, 4 p.m.

Mar. 4th.—Special and Ordinary General Meetings of the Central Division, N.V.M.A., Conway Hall, W.C.1, 6.30 p.m.

Mar. 5th.—Annual General Meeting of the Eastern Counties Division, N.V.M.A., at Norwich, 2.15 p.m.

Mar. 8th.—Royal Veterinary College, London, Annual Ball (in aid of the Re-Building Fund), Park Lane Hotel, W.1.

Mar. 17th.—V.V.B.F., Ladies' Guild: Dance, Princes Galleries, Piccadilly, W.

Mar. 19th.—Royal (Dick) Veterinary College Extension Fund Ball, Assembly Rooms, Edinburgh, 10 p.m.

April 1st.—Annual Fees due to R.C.V.S.

April 5th.—Last day for applications for tickets for R.C.V.S. Annual Dinner.

April 7th.—R.C.V.S. Committee Meetings.

April 8th.—R.C.V.S. Committee Meetings.

April 8th.—R.C.V.S. Annual Dinner, May Fair Hotel, Berkeley Street, W., 7.30 p.m.

April 9th.—R.C.V.S. Committee and Council Meetings.

May 6th.—Nominations for Election to R.C.V.S. Council due.

May 12th.—Coronation Day.

May 13th.—Entries for D.V.S.M. Examination due.

May 20th.—R.C.V.S. Voting Papers issued.

May 27th.—R.C.V.S. Voting Papers to be returned.

June 3rd.—R.C.V.S. Annual Meeting.
Victoria Veterinary Benevolent Fund Annual Meeting.

June 10th.—D.V.S.M. Written Examination begins.

June 14th.—D.V.S.M. Oral and Practical Examination begins.

June 23rd.—R.C.V.S. Committee Meetings.

June 24th.—R.C.V.S. Committee Meetings.

June 25th.—R.C.V.S. Committee and Council Meetings.

July 5th.—R.C.V.S. Written Examinations.

July 6th.—R.C.V.S. Written Examinations.

July 8th.—R.C.V.S. Oral Examination begins.

July 26th-30th.—N.V.M.A. Congress at Bournemouth.

R.C.V.S. OBITUARY

Murgatroyd, William Hiram, 4, Old Hall Road, Attercliffe, Sheffield. Graduated Edinburgh, May 21st, 1897. Died February 19th, 1937; aged 62 years.

Mr. Murgatroyd went to Sheffield from Keighley nearly 40 years ago, and for about 35 years was a veterinary surgeon in the Attercliffe district. Latterly he practised also at Beauchief. He was veterinary surgeon for many dog societies in Sheffield.

Mr. Murgatroyd leaves one son. Mrs. Murgatroyd died about three years ago.

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MISS ALEEN CUST'S DEATH: INFORMATION FROM JAMAICA

Through the courtesy of Dr. Bullock, Secretary and Registrar of the Royal College of Veterinary Surgeons, we are able to publish, for the information of the many friends of the late Miss Aleen Cust, M.R.C.V.S., an account of the circumstances in which occurred her lamented death, recorded in our issue of February 6th. The following references appear in a letter, dated January 31st, received by the Registrar from Captain G. O. Rushie Grey, M.R.C.V.S., B.Sc., of Molynes, Half-way Tree, Jamaica:—

"Miss Cust arrived in Jamaica on the morning of January 5th to make a riding tour of the island on horseback and I had made every preparation for her three months' holiday as she proposed sailing again on April 7th for England.

"She stayed with some friends in St. Andrew but had a severe heart attack on her first night. She quickly rallied but was confined to her room for about ten days. After that she went for drives, etc., on several of which I had the pleasure of conducting her, but she never got strong enough to indulge in any exercise.

"On the 28th, at 9.30 p.m., she rang me up to say that she was leaving Mr. Frank Cundall's house to spend a few days with some other friends and said that she was feeling almost her old self again. Next morning she was apparently packing for the move when Mr. Cundall's dog started a haemorrhage by scratching off a wart. She was asked by a maid to look at it. She improvised a cardboard collar for the dog and ligatured the bleeding vessel—and collapsed at 8.30 a.m. Her doctor (Morton, Englishman) arrived about twenty minutes later but said she must have died immediately.

"On the following morning at 8.30 her remains were interred at the St. Andrew Parish Church (Anglican) in the presence of many of her Jamaican friends.

"She came to Jamaica about five years ago in connection with the S.P.C.A. and did much useful work in Jamaica—work which will bear fruit in the future. She was very much liked by everyone who met her."

* * * * *

We regret to learn of the death of Mr. Sydney T. Lethbridge, Chairman and Managing Director of Spratt's Patent, Ltd., and who, joining the company in 1885, did much, by his outstanding business ability, to build up to its present great proportions this well-known organisation for the manufacture of dog food products.

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PERSONAL

An Isle of Ely "Worthy."—Mr. H. H. Truman, J.P., M.R.C.V.S., of March, is the subject of the most recent of the series of biographical articles appearing in the *Cambridgeshire Times* under the heading "Who's Who in the Isle of Ely." In

the course of this interesting account of Mr. Truman's activities as a veterinary surgeon who has for years been a leader in agricultural and horse-breeding circles, it is stated that Mr. Truman is not only a veterinary inspector for the Ministry of Agriculture and the Cambs. and Isle of Ely County Councils, but a March Urban Councillor, a Justice of the Peace, a Farmers' Union leader, and "probably the most famous Percheron horse-breeder in the kingdom." The article proceeds: "In 1925 he had the signal honour conferred upon him of being awarded the Croix de Chevalier Merité Agricole by the French Government for services rendered to agriculture in France. His association with agriculture in that country covers a period of over 30 years, during which he has paid frequent visits to purchase the best Percheron stallions and mares for shipment to America. It was Mr. Truman, in fact, who first imported Percherons into this country for show purposes. He was, in 1912, invited by the International Horse Show Society to exhibit representatives of the breed at Olympia, and he brought over from France the mare which eventually won the championship at Chicago, and the stallion which took first prize in his class and which was reserve champion stallion at the same show. To-day Mr. Truman's Percherons are famous the world over, and there is not the slightest doubt that the growing popularity of the breed is due in great measure to his propagandist activities. Naturally he is in great demand as a judge of the breed at shows up and down the country." He is a member of the Council of the Percheron Horse Society.

A quarter of a century ago Mr. Truman was appointed the first chairman of the March Branch of the National Farmers' Union. To-day he is still chairman; nor has there been any break in his period of office. Going to March from Whittlesey—of which town he is a native—40 years ago, he has taken the liveliest interest in the affairs of the town. In 1905 he offered himself for election to the Urban Council, and was successful. He has remained a member ever since. He has, too, a distinguished record in Freemasonry.

Will.—Norman, Mrs. Emily, of Plumpton, Sussex, widow of Joseph Norman, veterinary surgeon (net personalty £8,872), £10,633.

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LEGAL NOTES

Doping of Dogs: Magistrate's Comments.—At Bradford Police Court recently a fine of £25, with the alternative of three months' imprisonment in default, was imposed on Harry Hinchcliffe, 27, of Manchester Road, Bradford, former groundsman at the Greenfield Greyhound Racing Stadium, for accepting money from George Horne, a bookmaker, as an inducement to administer to certain dogs the drug phenobarbitone or to give money to Thomas Greenwood as an inducement to him to administer the drug.

Thomas Greenwood, 19, of Bierley House Avenue, Bradford, former kennel assistant at the track, was bound over for two years for accepting money from Hinchcliffe.

The two defendants had pleaded "Guilty" to the charges.

The Stipendiary Magistrate (Mr. Coddington) said that he had now read confessions the two defendants had made, and he thought it was right that the betting public should know in some degree the extent to which the defendants had cheated. "Nobody except their own wives will shed any tears over the loss of their bets by betting, but it is the policy of the law to protect all men from criminal swindling," he said.

The Magistrate gave the names of 16 dogs which Greenwood's confession mentioned had been doped in October and December. One of them, Flash Hubert, stated the confession, won in spite of the doping.

Sheep Scab Offences: £100 Fine.—At Duns Sheriff Court a farmer was fined £100 for having in his possession eight sheep affected with or suspected of sheep scab, and failing to give notice of the fact to the police, with having in his possession the carcase of a sheep which was affected with sheep scab, and with failing to keep records of the movements of stock in connection with his farm. A plea of guilty was tendered.

The Procurator-Fiscal stated that an outbreak of scab had occurred in another part of the county which had been duly notified. In the course of inquiries it was ascertained that the defendant had bought sheep from the same source, and an officer of the Ministry of Agriculture visited his farm on January 29th and found some of the sheep affected with scab. Accused told the officer that a sheep had died four days before, and on its carcase being exhumed it was found to be almost denuded of wool, and very badly affected with scab. The sheep had been in contact with neighbouring animals, and one of these was found to be suffering from scab. The officer said it might have been obvious to anyone that there was something seriously amiss with the sheep.

An agent said defendant was a dairy farmer, and though he kept about 100 sheep he had had very little experience in their management. He had bought these sheep at Lanark, and had no reason to suspect the existence of scab amongst them. He had spoken about them to some of his neighbours who were going among them frequently, and none of them so much as suspected the presence of scab. It was a case of ignorance and lack of knowledge about sheep stock.

The Sheriff said this was a case of gross carelessness, which might have led to disaster.

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WARBLE-FLY IN ABERDEENSHIRE: A COMPLAINT REPUDIATED

At a recent meeting the Diseases of Animals Committee of Aberdeen County Council considered a letter from the Ministry of Agriculture and Fisheries, which said that the Ministry had received representations from the Scottish Hide Inspection and Improvement Federation to the effect that the Warble-Fly (Dressing of Cattle) Order of 1936 was not properly observed last year in certain areas in Scotland. The Federation had named Aberdeenshire as one of the districts where the Order was disregarded, and stated in respect of that county that "not more than 40 per cent. of the farmers are thought to be dressing their cattle."

The Ministry requested observations on the allegations made by the Federation concerning the non-observance of the Order in the district.

There was also considered a letter from Chief Constable Gauld to the County Clerk, which said it would be interesting to know what grounds the Scottish Hide Inspection and Improvement Federation had for saying that the Order was disregarded in Aberdeenshire, and how they arrived at the conclusion that "not more than 40 per cent. of the farmers are thought to be dressing their cattle"; and a letter from Mr. George Howie, Chief Veterinary Officer for

Aberdeenshire, to the County Clerk, which said he should be inclined to agree with the Scottish Hide Inspection and Improvement Federation, for from observations made at the marts and during routine dairy inspection there seemed to be very little difference in the number of warbled cattle at the sales or in the byres, and there was little or no evidence of "dressing" on any of the cattle.

There was also submitted a letter from Chief Constable Gauld to Captain C. Macpherson, M.R.C.V.S., Inverness, the Ministry's representative in the north, regarding the administration of the Warble-Fly Order.

After describing the steps taken to enforce the Order in the county, the letter said: "My officers say that they believe the necessary treatment has been very generally carried out.

"Their attention has frequently been drawn to the fact that Irish cattle are usually very badly infested, and there is a feeling that if they are allowed into the country in this condition the treatment of the cattle here will not be so effective.

"Questions have been put to constables in the Upper Deeside district whether the fact that deer are usually badly infested with warbles would detrimentally affect the treatment of cattle. Is the warble on deer the same as attacks cattle? If so, is the range of the fly sufficient to bring it in contact with cattle unless they are actually grazing on ground frequented by deer?

"For a commencement I think the Order has been quite successful, but I should like to have more experience of it before I could say whether any alterations would be advisable to make the administration of it more efficient."

The County Clerk said there was no evidence forthcoming in support of the charge which had been made by the Scottish Hide Inspection and Improvement Federation, that not more than 40 per cent. of the farmers of Aberdeenshire were thought to be dressing their cattle.

Chief Constable John Gauld: It is known that the sale of derris root preparations has increased enormously during the past year. Surely that shows the preparations are being applied, unless the farmers are buying the stuff to store up for no purpose whatever. Undoubtedly there has been an enormous response to the recommendations in the Warble-Fly (Dressing of Cattle) Order.

Mr. W. Valentine, Thanestone, Kintore, who presided, said it seemed an extraordinary thing that any Government Department should accept a bald statement, without ever having asked if there were any proof of the statement.

The County Clerk said it was a very serious accusation to make, because it was in that committee that the question of dealing seriously with the warble-fly, and the deleterious effect its operations had on the hides of cattle, had first been raised, leading eventually to the passing of the Order now under discussion.

The Chairman: We certainly repudiate the allegation. (Applause.)

It was left to the Chairman and the County Clerk to reply to the Ministry's letter, and it was agreed that everything should continue to be done to carry out the Order efficiently.

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ARMY VETERINARY SERVICE

Movements of Officers

The following officers embarked for India for a tour of duty abroad on February 11th: Major P. S. Sparling, Major D'A. S. Beck, Captain C. U. K. Porter, Captain L. W. Coulden, and Lieutenant D. McK. Stewart.

Captain R. K. Kent, who has been on leave ex-India, joined at Bulford for duty on February 23rd.

Captain A. A. Kidd is at present in this country on leave ex-India until March 17th.

Lieutenant R. H. Duff is at present in this country on sick leave from India, and is now in Netley Hospital.

Major J. Bell, who arrived in this country from Egypt on February 18th, has been posted to the Eastern Command for duty.

Major F. B. Hayes, O.B.E., is at present in this country on leave ex-India.

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INDIAN VETERINARY CORPS

A competitive examination will be held at Lahore, beginning on May 4th, to select candidates for admission to the Indian Army Veterinary Corps as commissioned officers. There are 42 British veterinary officers on the Indian establishment, and in past years the Indian Corps has consisted of veterinary assistant surgeons in the ranks of risaldar major, risaldar, and jemadar, with a small number of warrant officers.

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MILK EXAMINATIONS IN LEICESTERSHIRE

Results of a Twelve-year Survey

In a report by the Leicestershire Medical Officer of Health on a survey of milk examinations in the county over a period of twelve years—January, 1925, to December, 1936—it is stated that with the close of the year 1936 the plate count method for the examination of raw designated milk ceased and in its place came the reductase test, which is now obligatory for these classes of milk.

In all 17,197 samples were examined by the plate count method in the county laboratory, of which 9,176 were collected by the sanitary inspectors in connection with the council's scheme for improving the milk supply. The samples were all collected by the sanitary inspectors of the various urban and rural districts, and they were classified as "Good," "Fair," "Moderate," and "Bad" according to their bacteria count and *B. coli* content. With a few exceptions, not sufficient to affect the whole, they were of raw undesignated milk collected "as delivered to the consumer." The results of the twelve years' work show that in 1925 54 per cent. were "Good" and 24·3 per cent. were "Bad." In 1936 76·1 per cent. were "Good" and 6 per cent. were "Bad."

Since 1928 records of the actual bacteria counts and *B. coli* contents have been kept, which reveal still more remarkable evidence of improvement. These show that in 1928 15 per cent. contained fewer than 30,000 organisms per c.c. and 34 per cent. more than 200,000 organisms per c.c. In 1936 41·9 per cent. contained fewer than 30,000 organisms per c.c. and 12·9 per cent. more than 200,000 organisms per c.c. The results of the examinations for *B. coli* content show that in 1928 38 per cent. showed none of these organisms in one-tenth c.c. and 11 per cent. in one-thousandth c.c. In 1936 71 per cent. showed none of these organisms in one-tenth c.c. and 5 per cent. in one-thousandth c.c.

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Edinburgh College Extension Fund Ball.—We regret that the time of the commencement of this function, to be held in the Assembly Rooms, Edinburgh, on Friday, March 19th, was incorrectly given in the announcement regarding the event published in our last issue. The Ball will commence at 10 p.m.

CRUDE COD-LIVER OIL IN TREATMENT OF WOUNDS

M. D. Daver, Civil Surgeon, Nizambad, Hyderabad, Deccan, writing in the *British Medical Journal*, of January 23rd, 1937, states that having read of the cod-liver oil treatment of wounds (Steel, 1935)* he was encouraged to make use of a crude cod-liver oil dressing as a routine, and has come to the conclusion that it has marked healing and aseptic properties. Besides being cheap, it is applicable to all kinds of wounds. He started using it first for minor injuries and indolent chronic ulcers. In order to estimate the efficacy of this method, half his cases were treated with recognised antiseptics such as acriflavine, mercurochrome, eusol, etc., while the other half were dressed with crude cod-liver oil. Not only minor injuries did well, but its application was justified in deep and extensive wounds. Several cases illustrating the gratifying results obtained are given, of which the following is an example:—

A man was admitted for a gunshot wound of the right leg. The bullet had splintered the tibia, and some of the fragments of the bone had penetrated the calf muscles. The wound was very dirty, and to stop the bleeding the villagers had applied some substance which was mixed with road dust. After taking the necessary surgical steps the author started using for dressing mercurochrome, acriflavine, and other antiseptics, but the wound would not heal, and green pus continued to discharge. After giving a fair trial to the above-mentioned antiseptics they tried crude cod-liver oil. The discharge lessened; there was none at all after the twelfth day and the wound was full of healthy granulations. Just for a trial, instead of using crude cod-liver oil, they used pure cod-liver oil. Their findings were interesting—granulations soon began to look pale and the healing slowed down considerably. On resumption of crude oil for dressing the wound again started healing and within a few weeks the patient was discharged cured.

Equally good results were obtained in patients very badly burned. It seems that the crude cod-liver oil has some healing property for skin, tissues and even bones, and that the crude oil is better for this purpose than pure cod-liver oil. It would be interesting to know the cause of this difference.

*Steel, T. P. (1935.) *Lancet*. 2. 290.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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THE FINANCE OF VETERINARY EDUCATION

To the Editor of the Veterinary Record

Sir,—I have read with interest the various criticisms of Sir Merrik Burrell's remarks at the Mansion House Meeting, and his replies.

I wonder if, in the whole history of the Mansion House, a Lord Mayor of London has ever before presided at a meeting, the object of which had not previously been fully explained to him. The events leading up to that meeting were so confused that Mr. Hall Masheter may well be excused for misinterpreting Sir Merrik's intention in arranging it. I doubt if any person, other than Sir Merrik, yet knows whether the Mansion House Meeting was called for the purpose of collecting funds for the Royal Veterinary College or for the wider field of veterinary education. Neither the various invitations to the meeting, the meeting itself, nor subsequent correspondence has done anything to clarify the situation. If this meeting was convened to raise funds for veterinary education, why did Sir Merrik subsequently issue to all bodies represented at that meeting, an appeal for funds for the Royal Veterinary College alone?

As it is apparently only recently that it has occurred to Sir Merrik Burrell to seek the opinion of the veterinary profession through the columns of the official organ of the National Medical Veterinary Association, I would invite him to peruse a letter which appeared in the *Veterinary Record* of August 18th, 1934, over my name, and also a quotation from Sir Farquhar Buzzard's Presidential Address to the British Medical Association which appeared on page 1261 in the issue of October 24th, 1936.

Lastly, sir, may I ask if Sir Merrik Burrell has ever seen the National Veterinary Medical Association's suggested scheme for the reorganisation of the veterinary profession?

Yours faithfully,

H. W. Steele-Bodger,
Hon. Secretary, Society of Veterinary Practitioners.

28, Lichfield Street,
Tamworth,
Staffs.
February 22nd, 1937.

* * * * *

To the Editor of the Veterinary Record

Sir,—I am obliged to Sir Merrik Burrell for his letter of February 13th, 1937. It bears out all I have tried to say and prove in my letters on this subject, *viz.*, that the Mansion House Conference was arranged to ask for £40,000 to complete the Royal Veterinary College, and to try and obtain a further £27,000 per annum which was needed *above its probable income* to keep it going (*vide* Sir Merrik's speech at the Mansion House, October 19th, 1936). That £27,000 per annum seems to have "slipped his memory."

By the way, the following is pertinent and interesting: "The recent meeting which was held at the Mansion House by the kind permission of the Rt. Hon. the Lord Mayor of London on October 19th was *originally* granted at the personal request of Sir Frederick Hobday and a journalist friend and well-wisher of the College. (Mr. Toye Vise) as a further means of adding to the Royal Veterinary College Rebuilding and Endowment Funds. . . . Although this *original* object was *not completely lost sight of*, the Principals of two of the other Colleges had been invited to attend and speak upon the subject of their own Colleges' needs. Representatives of the Councils of the R.C.V.S. and the N.V.M.A., and others, came prepared to take up the subject of the financial position of veterinary education generally, *but they were not called upon;* which was unfortunate as the audience contained a number of well known veterinarians who had an *accurate and practical* view of the subject, and had come from long distances prepared to speak."

Again: During Dr. Share-Jones' address "The Lord Mayor then rose to call Professor Share-Jones to order, as the meeting had been called *primarily* to consider the financial position of the Royal Veterinary College." Upon Dr. Bradley saying: "He could only assume the Lord Mayor was under a misapprehension." The Lord Mayor then rose and apologised to Professor

Share-Jones, stating that "he *was* under a misapprehension as to the scope of the Conference." (*Veterinary Journal*, October, 1936.) This finishes the controversy so far as I am concerned. I think it has "cleared the air" somewhat, as we now know that Sir Merrik Burrell, the Minister of Agriculture and the Secretary of State for Scotland have the matter in hand. Let us hope that their conclusions will be satisfactory to all the schools.

"The very errors and weaknesses of the past may be made by clear-sightedness and faith the danger-signals of the future, and may still serve to turn stumbling steps into the way that they should go."

Yours faithfully,
J. W. Hall Masheter.

Ruddle House,
Newnham-on-Severn.
February 22nd, 1937.

[*As this matter has been well ventilated, both in editorials and correspondence, it is considered advisable that the correspondence be discontinued, at least for the time being, until the committee appointed by the Minister of Agriculture and the Secretary of State for Scotland to review the subject of Veterinary Education has issued its report.*—Editor.]

* * * * *

"SWAY-BACK" IN LAMBS

Request for Material

To the Editor of the Veterinary Record

Sir,—I should be grateful if you would assist me by inserting this letter in the correspondence column of the *Veterinary Record*.

A considerable amount of work has been carried out in this Institute during the last few years concerning "Sway-back" in lambs. There can be no doubt that this disease constitutes a serious loss to the sheep farmer throughout the country. Although considerable progress has been made in the investigation of the disease, much remains to be discovered; the aetiology is still obscure.

I am anxious to obtain cases of the disease from as many parts of the country as possible in order to confirm many points concerning the incidence, pathology and genesis of the disease. I should, therefore, be grateful if those veterinarians who work in districts where the disease occurs, would be good enough to obtain cases for me and forward them to the Institute. Diseased lambs which had either died or had been killed shortly before being sent would serve my purpose.

I should be also indebted if some short history of the disease on the farms from which the case has been obtained was also furnished.

Yours faithfully,
J. R. M. Innes.

Institute of Animal Pathology,
Field Laboratories,
Milton Road,
Cambridge.
February 23rd, 1937.

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CRUELTY TO WATCH-DOGS ON FARMS

To the Editor of the Veterinary Record

Sir,—With reference to the article "Preventable cruelty on farms and in markets," has Mr. Saunders met with those cases of cruelty to watch-dogs which one sees fairly commonly on certain farms, and small-holdings? I refer to the type which is perpetually chained to a ramshackle barrel lying in filth, and devoid of bedding and adequate shelter. These wretched creatures are often suffering from mange, and crippled by frostbite, sometimes blind, and not infrequently suffering from an agonising cough. Perhaps the R.S.P.C.A. could urge the State to impose a dog tax upon all farmers who keep dogs for any purpose whatever; it would increase the value of the animal and be also a means of eradicating much suffering experienced by the more unfortunate dogs kept on farms.

Yours faithfully,
F. C. Heathcote, M.R.C.V.S.

Wittersham,
Kent.

Diseases of Animals Acts

SUMMARY OF RETURNS

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks reported by the Local Authorities.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 1st to 15th Feb., 1937	36	41	1	84	13	27	23	62	38
Corresponding period in									
1936	25	26	—	—	9	49	25	88	72
1935	23	24	3	371	13	21	20	70	29
1934	32	32	—	—	12	20	49	64	36
Total 1st January to 15th February, 1937	94	106	3	262	35	59	74	165	97
Corresponding period in									
1936	71	93	4	379	26	77	87	303	180
1935	60	64	20	4,285	39	54	103	213	79
1934	62	62	—	—	46	76	211	238	135

Note.—The figures for the current year are approximate only.

§ Excluding outbreaks in Army Horses.